JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

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PAGE

The Secretary's Page 169

Wisley in May 173

Present-day Problems of the Horticultural Industry. By F. A. Secrett, C.B.E., F.L.S., V.M.H. *Illustrated* . 175

Cyclamen persicum. By F. Streeter, V.M.H. *Illustrated* . 185

Eucalyptus in the British Isles. By D. Martin. *Illustrated* . 186

Lilium Sherriffiae, a new Himalayan Lily. By W. T. Stearn. *Illustrated* 190

Some Scented-leaved Plants. By A. D. B. Wood . . 192

Notes from Fellows:

The White-bark Pine. Brian O. Mulligan. *Illustrated* . 197

Meconopsis × Sheldonii. By Cicely M. Crewdson . 198

Leaf Spot Disease of Cineraria (Senecio cruentus) new to Great Britain. By D. E. Green, M.Sc., and M. Ann Hewlett, B.Sc. *Illustrated* 199

Some Chilean Plants Cultivated in Britain. By G. W. Robinson. Part II 202

Award of Garden Merit—LXXXIV. *Illustrated* . . 208

Book Notes 211

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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXXV Part 5

May 1950

THE SECRETARY'S PAGE

ANNOUNCEMENTS—MAY AND JUNE

Shows, Lectures and Meetings at the Society's Hall

TUESDAY, MAY 2. 12 NOON TO 7 P.M. First day of Fortnightly Show and Rhododendron Show.

3 P.M. LECTURE: "The Gardens at Bodnant" by THE PRESIDENT THE LORD ABERCONWAY, C.B.E., LL.D., V.M.H.

WEDNESDAY, MAY 3. 10 A.M. TO 5 P.M. Second day of Show and Rhododendron Show.

CHELSEA SHOW

TUESDAY, MAY 23. 2 P.M. TO 8 P.M. Private View.*

WEDNESDAY, MAY 24. 8.30 A.M. TO 8 P.M.

THURSDAY, MAY 25. 8.30 A.M. TO 8 P.M.

FRIDAY, MAY 26. 8.30 A.M. TO 5 P.M.

* *Note :* This is a Private View for Fellows and Associates. On receipt of his subscription each Fellow and Associate is sent one ticket with a special detachable portion which alone will admit to the Private View.

Shows, Lectures and Meetings at the Society's Hall

TUESDAY, JUNE 6. 12 NOON TO 7 P.M. } *Iris Society's*
WEDNESDAY, JUNE 7. 11 A.M. TO 5 P.M. } *Show.*

TUESDAY, JUNE 13. 12 NOON TO 7 P.M. First day of Fortnightly Show.

British National Carnation Society's Pink Competition.

3 P.M. LECTURE: "The Cooking of Vegetables" by MONSIEUR F. VINCENT

WEDNESDAY, JUNE 14. 10 A.M. TO 5 P.M. Second day of Show.

Shows, Lectures and Meetings—*cont.*

TUESDAY, JUNE 27. 12 NOON TO 7 P.M. First day of Fortnightly Show.

Flowering Tree and Shrub Competition.

First day of National Sweet Pea Society's Show.

3 P.M. LECTURE: "The Hybridizing of Lilies: an amateur's approach" by O. E. P. WYATT.

WEDNESDAY, JUNE 28. 10 A.M. TO 5 P.M. Second day of Show. *National Sweet Pea Society's Conference.*

Second day of National Sweet Pea Society's Show.

FRIDAY, JUNE 30. 12 NOON TO 7 P.M. *National Rose Society's Show.*

Demonstrations at Wisley—The following demonstrations will be given at Wisley, that on the second day being a repetition of the demonstration given on the first:—

Vegetable Garden

May 10, 11. Thinning, Transplanting and Successional Cropping. (2–4 P.M.)

Flower Garden

May 31, June 1. Summer Pruning of Shrubs. (2–4 P.M.)

British Delphinium Society's Show.—Fellows are asked to note that the date of the British Delphinium Society's Show is incorrectly shown on Fellows' tickets and in the Society's Diary. The British Delphinium Society will hold its annual competition in the Westminster Dragoons' Hall in Elverton Street, Westminster, between 12 noon and 6 P.M. on Wednesday, June 28, the second day of a Fortnightly Show. The Westminster Dragoons' Hall is just across the street from the New Hall, at the junction of Elverton Street and Horseferry Road. Fellows' and Associates' tickets will admit between the hours stated above.

ARRANGEMENTS FOR CHELSEA SHOW, 1950

Dates of Show – The Show will be held on Wednesday, Thursday and Friday, May 24, 25 and 26, in the grounds of the Royal Hospital, Chelsea, London, S.W. 3.

Private View – There will be a special Private View on Tuesday, May 23, between 2 P.M. and 8 P.M., open only to Fellows and Associates as shown on their tickets. For details please refer to the paragraph below relating to Fellows' tickets. *In no circumstances, by payment or otherwise, can extra admissions to the Private View be allowed.*

Times – *Fellows and Associates*

Fellows, Associates, and holders of Fellows' Transferable Tickets are admitted free during the following periods:

Wednesday, May 24	8.30 A.M. to 8 P.M.
Thursday, May 25	8.30 A.M. to 8 P.M.
Friday, May 26	8.30 A.M. to 5 P.M.

The Public

Admission on payment may be obtained only during the following periods:

Wednesday, May 24	12 noon to 8 P.M.	Admission 10*s.*
Thursday, May 25	8.30 A.M. to 8 P.M.	,, 5*s.*
Friday, May 26	8.30 A.M. to 5 P.M.	,, 2*s.* 6*d.*

In no circumstances can admission by payment be gained during the following periods:

Tuesday, May 23 between 2 P.M. and 8 P.M.
Wednesday, May 24 between 8.30 A.M. and 12 noon.

Parties – No reduction in the price of admission can be made for parties of visitors, but tickets may be obtained beforehand to save trouble on arrival. Application, accompanied by a remittance to cover the cost of the tickets required, should be made to the Secretary early in May.

Admission of Children – Children under five years of age cannot be admitted. The charge for the admission of children over five years of age will be the same as for adults.

Fellows' Tickets – A Fellow subscribing 4 guineas annually receives 1 non-transferable and 5 transferable tickets. (The non-transferable ticket has a *detachable* portion admitting the fellow and one friend to the Private View of Chelsea Show.)

A Fellow subscribing 3 guineas annually receives 1 non-transferable and 2 transferable tickets. (The non-transferable ticket has a *detachable* portion admitting the fellow and one friend to the Private View of Chelsea Show.)

A Fellow subscribing 2 guineas annually receives 1 transferable ticket. (This ticket has a *detachable* portion admitting only the Fellow to whom it is issued to the Private View of Chelsea Show.)

An Associate receives 1 non-transferable ticket. (This ticket has a *detachable* portion admitting only the Associate to whom it is issued to the Private View of Chelsea Show.)

Each Fellow's Ticket, both non-transferable and transferable, will admit one person at any time when the Show is open on Wednesday, Thursday, Friday, May 24, 25 and 26, but the non-transferable Ticket may, of course, be used only by the Fellow to whom it is issued. An Associate's Ticket may be used only by the Associate to whom it is issued.

Tickets may not be left at the turnstiles for collection by persons visiting the Show later, but may be posted in the Post Box in the grounds.

Catering – It is regretted that it is not possible to provide set luncheons and teas, but buffets for the service of light refreshments will be available. There will also be separate enclosures for the service of alcoholic beverages.

Post Office and Telephones – A Post Office for the transaction of ordinary Post Office business will be found in Main Avenue, as will also several Public Telephone Boxes.

Band – The Band of H.M. Grenadier Guards will, by courtesy of the Officer Commanding, play each afternoon in the Ranelagh Gardens.

Cloakroom – A cloakroom at which bags, parcels, etc., may be deposited will be situated in Main Avenue.

Invalid Chairs – The arrangements for the admission of invalid chairs will be as follows:

On Tuesday, May 23, Fellows and Associates in invalid chairs will be admitted between 2 P.M. and 8 P.M. on presentation of tickets for the Private View. There will be a charge of 5*s.* for each chair, and that charge will cover one attendant.

On Wednesday, May 24, no invalid chairs can be admitted.

On Thursday, May 25, invalid chairs will be admitted only between 8.30 A.M. and 12 noon on presentation of Fellows' or Associates' tickets, or on payment of 5s. for the occupant of the chair. There will also be a charge of 5s. for the chair, and that charge will cover one attendant.

On Friday, May 26, invalid chairs will be admitted only between 8.30 A.M. and 12 noon on presentation of Fellows' or Associates' tickets, or on payment of 2s. 6d. for the occupant of the chair. There will also be a charge of 5s. for the chair, and that charge will cover one attendant.

TRANSPORT

Visitors travelling to London will find the following Railway and Bus Services of London Transport operating from the Main Line Termini:—

CANNON STREET (*Railway*). District Line direct to Sloane Square.

CHARING CROSS (*Railway*). District Line direct to Sloane Square. (*Buses*) Number 11 to Lower Sloane Street, Pimlico Road.

EUSTON (*Railway*). Northern Line to Charing Cross, thence by District Line train to Sloane Square.

FENCHURCH STREET (*Railway*). Tower Hill direct to Sloane Square.

KING'S CROSS AND ST. PANCRAS (*Railway*). Piccadilly Line from King's Cross and St. Pancras station to Leicester Square, thence Northern Line to Charing Cross, thence District Line to Sloane Square. Or Circle direct to Sloane Square. (*Buses*) Numbers 77, 77A, to Trafalgar Square, thence Numbers 11 or 39 to Lower Sloane Street, Pimlico Road.

LIVERPOOL STREET (*Railway*). By Circle Line direct to Sloane Square. (*Buses*) Number 11 to Lower Sloane Street, Pimlico Road.

LONDON BRIDGE (*Buses*). Number 10 to Victoria, thence by Numbers 11, 39, or 46, to Lower Sloane Street, Pimlico Road.

MARYLEBONE (*Railway*). Bakerloo Line to Paddington, thence by Circle Line to Sloane Square.

PADDINGTON (*Railway*). Circle Line direct to Sloane Square. (*Buses*) Number 36 to Marble Arch, Park Lane, thence by Number 137 to Chelsea Bridge Road, Royal Hospital Road.

VICTORIA (*Railway*). District Line direct to Sloane Square. (*Buses*) Numbers 11, 39, or 46, to Lower Sloane Street, Pimlico Road.

WATERLOO (*Railway*). Northern or Bakerloo Line to Charing Cross, thence by District Line to Sloane Square. (*Buses*) Number 46 to Lower Sloane Street, Pimlico Road.

BAKER STREET (*Railway*). Inner Circle direct to Sloane Square. (*Buses*) Numbers 2, 30, or 74, to Marble Arch, Park Lane, thence by Number 137 to Chelsea Bridge Road, Royal Hospital Road.

No facilities for cheap travel for parties of visitors are available.

Sloane Square Station is about 800 yards from the Main Entrance, the way being via Lower Sloane Street and Royal Hospital Road.

WISLEY IN MAY

FOR those who are seldom able to visit Wisley, and for those who have not been before, no month can be more strongly recommended than May, when there is a greater variety of plants in flower than at any other season. It would not be possible to see all there is in a single visit, but by following the route suggested in the 'Guide to Wisley Gardens' a good general impression of the layout could be gained and no feature of importance would be missed.

One of the chief attractions at the present time is the Lilac collection. Over a hundred different varieties and some species are planted in Howard's Field, where, despite poverty of the soil they usually flower very freely. Howard's Field is rather remote from the main entrance to the Gardens; but by taking the path leading northwards from the Temperate House, past the Azalea garden, where the old-established bushes will be full of bloom, and across Seven Acres as far as the River Wey, one reaches a pleasant grassy path through the Pinetum. The earliest Lilacs to flower are 'Mirabeau' and 'Lamartine,' but there are many of greater merit to follow. Some reliable ones are 'Souvenir de Louis Spaeth,' with long, deep purple trusses, and 'Massena,' with unusually large individual flowers of a redder hue. 'Madame Lemoine,' no longer a novelty, is still among the best double whites, and 'Vestale' holds its shapely trusses of single white blossom well above the foliage, and is less discoloured by bad weather than some. Then there are others of uncommon colour or form, such as the clear, blush-pink 'Macrostachya,' and the bright rose-coloured 'Maréchal Foch,' with loose, open panicles.

One may return by the main walk through the Pinetum to Seven Acres, where the shrubs in flower include many different Barberries. The majority of these are most ornamental in fruit, but several are worth planting for their flowers. *Berberis vernae*, for example, has arching branches set with numerous pendent yellow racemes, and *B. montana*, which has large, orange and gold blooms freely produced among fresh green leaves, is one of the very best of its genus. That most excellent evergreen hybrid, *B. stenophylla*, raised nearly a century ago from a cross between *B. Darwinii* and *B. empetrifolia*, has produced a number of seedling forms reverting more or less to one or other parent. Some of these are low-growing, compact plants very suitable for the front of the shrub border. *B. verruculosa*, usually regarded solely as a foliage plant, is now bearing comparatively large, primrose-yellow flowers contrasting agreeably with its dark, lustrous leaves.

Several flowering trees are worth noting. The Exochordas are among the most graceful, and their large, racemed flowers are of purest white. Almost every twig of the Flowering Dogwood, *Cornus florida*, bears at its tip a minute flower-cluster surrounded by four white, petal-like bracts, even more lovely in the variety *rubra*. *C. Nuttallii*, which has usually six much larger bracts, is represented by a young tree near the round pond, but it is often somewhat disfigured by late frosts at Wisley and is, on that account, less satisfactory than *C. florida*. *Halesia carolina*, the Snowdrop Tree, draped with creamy bells,

Magnolia cordata, a yellow-flowered American species related to the more familiar Cucumber Tree, and the curious graft-hybrid *Laburnocytisus Adami*, are among the other interesting trees.

In the Wild Garden there is a wealth of Primulas, Welsh Poppies, Lilies of the Valley, Bluebells and the arching white sprays of several forms of Solomon's Seal, together forming a multi-coloured carpet beneath the flowering shrubs. *Magnolia Sieboldii* will be carrying a succession of sweetly scented pendent white flowers, enhanced by a boss of crimson stamens, in company with *M. Wilsonii*, larger in flower and taller in growth, joined later in the month by *M. Watsonii*, the heavy odour of which is widely diffused, especially towards evening.

The greatest mass of colour is, however, provided by the tall specimens of some of the old hybrids of *Rhododendron ponticum*, which give admirable shelter to more valuable things. From the upper slopes of the rock garden one can see the tops of these old trees, massed with bloom in white and many shades of red and rose, among the pale verdure of the oaks.

There should be plenty of interesting flowers in the Rock Garden this month, although, as we pointed out before, many are newly planted and in consequence may not be flowering with typical freedom. Aubrietias, Saxifrages and varieties of Phlox will still be prominent; Penstemons such as *P. Scouleri* and *P. Newberryi* with lilac and cerise flowers, *Cytisus kewensis*, with long trails of primrose-yellow, *Roscoea cautleoides* with Orchid-like flowers of a similar shade and the rich purple *R. Humeana* are among others in flower now.

On the margins of the long pond, where the great clumps of Royal Fern are unrolling their fronds, will be found many of the moisture-loving Primulas, including the mauve *P. yargongensis* and many of the Candelabra section, and the double form of *Caltha palustris* is covered with its tight little golden rosettes. Near the Wisteria-covered bridge the first flowers of *Iris laevigata* in rich blue-purple will be opening towards the end of the month. Several varieties of this species are grown but none has the beauty of the type.

In the Alpine House the arching white panicles of the varieties of *Saxifraga Cotyledon* are very conspicuous, forming a background for a great variety of smaller plants. The neat, long-lasting carmine, pink or white flowers of *Rhodohypoxis Baurii* make it a general favourite, and some others which always command admiration are the large-flowered soft rose *Phlox mesoleuca*, *Erinacea Anthyllis*, the Hedgehog Broom, with lavender flowers among grey-green spine-tipped shoots, the delicate *Oxalis adenophylla*, which has wide, lilac blossoms and quaintly folded, many-parted leaves, and *Globularia bellidifolia*, a green mat of foliage supporting numerous powder-blue flower-heads.

A visit to Battleston Hill will be rewarded with plenty of interest. The Kurume Azaleas, planted to form a carpet, the very hardy *R. malvaticum* × *Kaempferi* hybrids, and the deciduous Azaleas in the Trials will all be at their best. Nearby, in the hardy hybrid Rhododendron Trials, Fellows may make their own choice with every confidence of success in a lime-free garden. Over the public footpath, by either of the two bridges into the woodland garden, is a wealth of the choicer

Rhododendron hybrids, the majority grown from layers of the original plants. *R. discolor* hybrids will be prominent, and 'Lady Bessborough' (stone cream), 'Angelo' (a huge white with green blotches), 'Ladybird' (a lovely pink), 'Avocet' (a sweet-scented *R. Fortunei* cross), 'Albatross' (a descendant of *R.* × *Loderi*, equally large and beautiful), together with the best *R.* × *Loderi* forms, should all attract attention.

In the Trial Grounds the first of the tall bearded Irises will be opening. The collection now includes some of the newer American varieties, which exhibit some striking colour-combinations, but these have not been planted long enough to make their maximum display. Among the remainder there will be such favourities as the golden 'Joan Lay,' 'Great Lakes' of clear light blue, and 'St. Osyth' of palest blue.

PRESENT-DAY PROBLEMS OF THE HORTICULTURAL INDUSTRY

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LATE ADVISER ON VEGETABLE PRODUCTION, MINISTRY OF AGRICULTURE

(*A lecture given before the Royal Society of Arts and reprinted by kind permission of their Editor*)

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I PROPOSE to speak upon some of the problems confronting us from within and without. I shall deal this afternoon with my theme under three main headings: first, Equipment; secondly, Research; and thirdly. Labour. In conclusion, I shall include one or two subjects which are not covered by the three main headings, leading up to a summary of the remedies which, in my submission, are essential.

During the war period the Ministry of Agriculture, in close collaboration with the National Farmers' Union, guided the industry from normal peacetime production to that of an increased supply of vegetables and other essential food. By 1944 horticultural crops were raised on one-thirtieth of the total area of land used for all agricultural purposes. As a result, vegetables were in goodly supply and remained unrationed throughout the war period. This expansion in vegetable crops was inspired, guided, propelled, and made possible from first to last by the resource, temper, and skill of all concerned under the presiding office of the Minister of Agriculture.

Since the end of the war, owing to uncertainty as to Government intentions, there has been anxiety and bewilderment among all growers, with nervous scrutiny of the future. County Agricultural Executive Committees, acting as the agents of the Ministry, require a certain standard of efficiency from every grower. Each holding is graded by merit and if a grower fails to reach the set standard he may eventually be dispossessed of home and holding.

EQUIPMENT

Efficiency is largely dependent on modern equipment such as suitable sheds, glasshouses, machines for cultivating, grading, washing plants, and adequate supply of water, sufficient cottages and canteens, and packing materials as good as those used for our foreign imports.

In 1938 I purchased a dairy farm of 190 acres at Milford, near Godalming, which has since been extended to 350 acres. The fertility has been raised considerably and it is now suitable for the cultivation of choice vegetables and flowers. This involved the outlay of much capital and I believe my own experience to be typical of the industry as a whole. Progress was held up by the war but has since been resumed. Only those who have endeavoured to make such developments in post-war years will appreciate the frustration and heartache caused by controls and planning.

The total of capital invested in horticultural industries must be a vast sum, as that invested in the glasshouse section alone represents over fifty millions sterling. The cost of erecting one acre of glasshouses to-day including heating and other equipment, is not less than £12,000, and the comparable figure before the war was £4,000. (In neither case is the cost of the land included.) The cost of covering an acre with Dutch lights and watering equipment is over £2,000. To establish and equip a modern intensive holding (with a small area of glass for protecting and forwarding plants) costs from £250 to £300 per acre, including the land and irrigation. It is doubtful if land can be planted to top fruit (pears, apples, and plums) at less than £300 per acre, if the cost of the land and the waiting period between planting and bearing are included, as they should be.

Lay Out.—At Milford hedges and trees were removed and high banks were levelled; waste land was brought into cultivation and so the maximum floor-space for crops was obtained, for unproductive land increases the overhead costs.

Good roads are important on a horticultural holding, as heavy tonnages have to be moved throughout the year. Earth roads take a heavy toll on labour and machinery; concrete roads are essential on certain soils. Initial outlay is high but this is balanced by the low cost of maintenance and the increased speed of movement.

Buildings and Fittings.—Few farm buildings are suitable for market gardens. Some are adaptable but, in the main, sheds should be designed to relieve manual labour. All loading should be done from a platform and conveyor belts may be used with advantage. Packing sheds should be equipped with washing and grading machines and particular attention should be given to lighting, both daylight and artificial. This entails the installation of heat, water, and power. (Figs. 99–102.)

Glasshouses and Forcing Sheds.—Glasshouses and forcing sheds play an important part in the successful running of an intensive holding. They provide work for the labour during the winter months when outside work has been brought to a standstill by climatic conditions. Out-of-season produce always finds a ready sale, improves the grower's prestige, and ensures a continuous source of income to meet the weekly wage bills. (Fig. 96.)

Cold Lights and Cloches.—During the last three decades there has been a great development in the use of cold frame lights and cloches. This type of culture has now become very popular as it gives scope to imagination and thoughtful planning, and this is one branch of horticulture where there is still room for expansion. Available capital limits the work and it is usually expedient for this type of culture to be practised as a branch of general vegetable production. (Figs. 93, 97 and 98.)

Irrigation.—Equipment to secure an adequate water supply is most important, as a limited supply makes a grower dependent on the weather. Without water crops perish; if it is available only in small quantities or applied too heavily crops are liable to suffer from pest and disease. The equipment for an irrigation system varies from holding to holding, and is largely controlled by the source of the water supply. Firms, fully qualified to advise on this subject, specialize in equipment and lay-out, but little research has been attempted on the use of water, and this will be referred to presently. (Figs. 91, 92 and 95.)

Tractors.—Tractors, row-crop tools, and spraying machines all play important parts in the efficient working of a holding. More attention is now being given to correct and thorough cultivation and to the control of pests and diseases. For horticultural work track-laying machines are preferable, as there are many occasions when a wheeled tractor is useless. In spite of all recent developments in machines horses are still essential on horticultural holdings, especially where irrigation is practised, as there are so many occasions when heavy tractors cannot be used after watering. (Figs. 103 and 104.)

Cottages.—Housing shortage has caused many market-gardeners to erect their own cottages for key workers; with the addition of roads and services another heavy capital expenditure is involved.

General Costs.—Apart from the capital necessary for development, since 1938 the cost of materials has risen sharply. For example, the cost of seed has increased by 300 to 400 per cent.; labour charges are up by 170 per cent.; cattle manure is 300 per cent. higher; and the cost of wooden crates has risen by at least 400 per cent. Crates which could be purchased for 10*d.* before the war are now 3*s.* 9*d.* Organic fertilizers cost £30 to £45 per ton against a pre-war figure of £10 to £15 per ton.

These few examples will be sufficient to enable the thinking man to refute the accusation so often levelled against growers that their prices are too high. Nothing works such havoc with the truth as sweeping generalizations like this one. The various items of capital expenditure enumerated, which are common in horticulture, serve to place this industry in true perspective. Market growers are among the world's hardest and most efficient workers, and have earned their right to just and sympathetic treatment.

RESEARCH

Research, advisory work, and education all play their part. Progress has been made during recent years, but the work has been hampered by the acute shortage of fully qualified scientists and research workers. Horticulture now has the same status in the advisory service as general agriculture. In the past many crops were lost through the apathy of the

grower, his lack of knowledge, and failure to diagnose disease in its early stages, remedial action was consequently belated and useless. The advisory service is now available to all growers, and the adviser comes not as a critic but as a friend, who has the whole of the provincial staff at his service. The industry owes a debt of gratitude for the pioneering work that has been accomplished in the establishment of this service. As growers become more conscious of the benefits to be derived from science and research, the standards of production and of general hygiene on their holdings will be raised. Approach to the small grower would be simplified by more visual examples of the work on other farms such as the film of marketing which has been prepared at Milford.

No knowing and impartial observer would deny that the enlightened policy adopted by the Ministry of Agriculture will bring great benefits to the industry and to public health by general improvement in fresh salad and vegetable supplies. Direct research is carried on by the research worker or the progressive grower on the farm. Analogical research is conducted in the laboratory. Its purpose is to test, to illustrate, to interpret or expand, the lessons that have been learnt by direct research on the farm, or to explore the paths which such direct research has suggested. There is an overriding need to test and correct our practices by the scientific method, whether the approach be to new problems or to the fresh investigation of old ones.

Rumour is a Pipe
Blown by Surmises

and it may well be—let us indeed hope that it is—a false alarm that H.M. Treasury projects cheese-paring in our Horticultural Research Stations. Such a step would resemble rather the desperate act of a spendthrift in suspending the payment of his fire insurance premiums than good husbandry of our productive resources. I prefer not to dwell on such a catastrophe, but to turn again to what has actually been accomplished and had recently been planned in this country.

Land has been bought at Wellesbourne, near Leamington in Warwickshire, for the National Vegetable Research Station. A Governing Body has been appointed and work has started in earnest under the inspiring direction of DR. PHILP. In addition, land has been bought for experimental stations in Hampshire, Worcestershire, Yorkshire and Lancashire. In the South-Western region problems are so different from those prevailing elsewhere that it is intended to establish a separate station, and steps are being taken to acquire suitable land. These experimental stations will all co-operate and demonstrate the results of research work done at Wellesbourne and they should lead to a much greater spread of knowledge.

Land has also been bought at Merryworth in Kent for National Fruit Trials, and this work is being transferred from less suitable ground in the Royal Horticultural Society's Gardens at Wisley. Research on flowers is being dealt with at Kirton in Lincolnshire, and research on mushrooms at Yaxley near Peterborough.

The development programme includes a new Glasshouse Station. The present comparatively small station at Cheshunt, under the direction

of DR. BEWLEY, has contributed most valuable research work, but it is inadequate for the needs of the Glasshouse industry. Research relating to flower production will also be dealt with by the Glasshouse Station.

This is a comprehensive programme involving heavy capital oulay, since laboratories, glasshouses, and other equipment must be provided, together with dwellings for the research staff and manual workers. The initial cost will admittedly be high, but in a few years it should prove a valuable national investment. At this critical stage the whole industry pleads that development should not be shelved until some future date. Now that these sites have been bought they should be promptly equipped or no one will be benefited. In many branches of horticulture we have floundered too long in the mist and fog of empirical knowledge with its concomitant of continual waste.

I attach cardinal importance to high standards of cleanliness of food shops, and growers can assist by giving close attention to cleaning, grading, and packing. Vegetables are still living when in the markets and they continue to breathe out carbon dioxide. If this gas cannot escape from celophane-wrapped packages, damage is done. Many distributors will not handle such sealed packages because their contents deteriorate so quickly. It is not true that growers are against progressive methods, whether in cultivation or in marketing; but let us first make sure that new methods proposed are really progressive.

Irrigation.—Though irrigation equipment has been studied by private firms, there has been no systematic research on the proper use and application of artificial rain. I have had the opportunity of watching scientists from Rothamsted working on the irrigation of sugar beet on my farm at Milford and I have been impressed by my own lack of knowledge on this important subject. On balance, I am strongly in favour of artificial rain, but before we determine its correct application we should make full allowance for the fact that natural rain is warmed and aerated by its passage through the atmosphere. The physical characteristics of cold tap or well water are consequently very different from those of natural rain with its high oxygen content.

We also need to know considerably more of the properties of dew, for its penetrating powers are noticeably greater than those of rain. If we could imitate the effect of natural dew during the hours of darkness and in the early morning this would probably do more good than a heavy application of tap or well water. Dew supplies water to the plant without any loss of soil temperature, and it also seems to have a stimulating effect on growth. If the necessary investigations can be continued it may well be that in a few years' time spraying equipment from the irrigation plant will even be used for the control of May frosts on fruit trees. It has, indeed, been affirmed by foreign research workers that it is possible to give protection against night frosts with temperatures as low as 14° F. or 10° C. below freezing point. This would be done by creating and maintaining a fine veil of moisture suspended in the atmosphere, so that the plant or tree would be entirely covered with little beads of water. Complete atomization is essential for the success of this work. Just imagine what a saving of fruit and vegetables could be effected by research progress in this one field alone! It would be unwise

to cut down research work which would eliminate waste and increase production when we are confronted with almost insuperable difficulties in finding dollars to buy food in some markets.

During recent years trace elements and fertilizers have been applied to plants and trees by spraying the leaves or branches with water in which minute quantities of these materials have been dissolved. There is little doubt that the most efficient method of applying fertilizers is in solution; much smaller quantities may be used than when they are applied dry, and results more than justify the experiment.

In a sentence, we are in urgent need of help from the research worker for guidance on the quantity, the time and rate of application, the temperature and aeration of water, on its possibilities as a medium in applying trace elements and fertilizers, and on many other matters.

Soil Fertility.—Let us now turn from irrigation to soil fertility. Possibly there has been a larger amount of research work in this subject than in many others, but the *humus* versus *inorganic* controversy still rages. On the one side we have extreme statements to show the adverse effect upon health caused by the use of inorganics, and on the other side equally forceful arguments on the value of inorganics.

Let us at once clear the ground by admitting, as indeed horticulturists always have done, the importance of keeping the soil in proper physical condition. No soil can be kept "in good heart" without repeated application of humus in some form, since humus leads to development of soil micro-organisms, holds moisture, promotes aeration, encourages earth worms, and provides the best conditions for root development. It is in line with nature's age-old law of life to decay, and from decay to life again—a law which cannot be broken without penalty.

The food of plants is obviously not limited to nitrates, phosphates and potash, for they need many other substances, some perhaps unknown and some in very minute quantities, but their total needs appear to be supplied by good stable manure or natural humus. The rival merits of the organic or the inorganic fertilizer continue to vex the minds of growers, but possibly the truth lies midway between the two schools of thought. Be this as it may, where much humus is regularly applied there is, invariably, comparative freedom from pests and disease.

The degree of soil acidity is important since it may influence the quality and nutritional value of the vegetables produced. Acidity is caused in the main by poor cultivation, lack of good drainage and an excessive use of inorganic salts—in short, by an incorrect physical condition of the soil. Now that doctors and scientists are so keenly concerned with safeguarding public health, it is hoped that joint research may be extended to include consideration of soil fertility in relation to their own problems.

Weeds.—The work of DR. BLACKMAN on the subject of controlling weeds by chemical sprays has been of great value, but much care is necessary when spraying is practised and many growers have not ventured as yet to adopt this method of control. Thorough, correct cultivations and the maintenance of soil fertility change the type of wild flora

and may provide an answer to the weed problem, which should be eradication rather than control.

When I purchased my farm at Milford, the chief weeds were cat's tail, spurrey and mare's tail; but as fertility was improved by cultivations and applications of humus these weeds died out and were replaced by groundsel, grass and chickweed. The land has now reached the stage where it produces dwarf stinging nettles in profusion, a sign of very high fertility. At this stage, if care is taken to prevent weeds seeding, and all humus applied has been heated to a point where weed seeds are destroyed, there is in my experience no reason why any crop should become weed-infested.

After a crop has been sown or planted cultivation is continued with row-crop tools and hand hoes for moving the soil round the plants. This provides better aeration, more warmth, and checks the loss of moisture. These operations all tend to stimulate growth during the early part of a plant's life which is the most important time. The continual use of sprays often causes hoeing to be neglected, and this is a serious loss to the plant, also the use of certain sprays has a temporary depressing effect on growth. How much need and scope for research these problems afford!

Much that I have said on the use of sprays against weeds applies also to insecticides whose prodigal use may lead us into serious trouble. For example, since D.D.T. has been used extensively blue-cabbage Aphis infection has increased perceptibly, and it is obvious that in our ignorance we are liable to destroy beneficial insects by attacking others. If the *p*H of the soil were maintained at between 6 and 7, this would do much to deter leaf-sucking insects; acidity is as harmful to some plants as to the animal kingdom.

Mechanization.—This can be divided briefly into two sections:

(*a*) Complete mechanization of the farm, even at the expense of yield, with the sole aim of replacing manual labour.

(*b*) Making as full use of mechanical implements as is compatible with producing the maximum yield of which land is capable.

Both methods are closely linked with costs but, in general, we should be concerned with production cost per ton, not per acre. The cheapest way to reduce costs is by increasing tonnage, and this can only be done by maintaining maximum plant population per acre. In this respect our country has much to learn from continental growers. High tonnages and first-class quality are usually found together, and their close association makes the need for further scientific investigation a matter of vital importance.

Stocks and Seeds.—For many years this industry has been well served by the large seed houses in this and in other countries, by the introduction of new varieties, and by the selection of improved strains, yet there is great need for additional research, and investigation on a national basis. During the last few years virus diseases of plants have much increased, and to-day it is, for example, difficult to find a clean stock of Lettuce. An entirely new disease has recently appeared in Cauliflower; some suspect virus, others consider it is caused by a trace element

deficiency. Many existing stocks and strains of vegetables need purifying. Investigation must commence with stocks which are available and in use, and for this purpose a variety testing station will be needed. The necessary arrangements have been made for this work to take place at Paglesham, in Essex, under the direction of the National Vegetable Station.

LABOUR

Unless adequate labour is available all other expenditure is wasted. Although a machine may replace man-power on the production side, to a certain extent the industry will always be dependent on hand labour all the year round for the gathering, harvesting, and grading of produce. The market-garden differs in this respect from the general farm, where harvesting is now mechanized and is confined to definite periods of the year. (Fig. 94.)

It is evident that shortage of labour will be one of our industry's greatest problems in the near future. Before the war many women from the towns appreciated seasonal labour on a holding, but better home conditions and improved facilities have curtailed this old periodical exodus. During the war-period the Agricultural Executive Committees and the Women's Land Army fulfilled a vital need, for at least 60 per cent. of the labour from both sources was employed in horticulture. What does the future offer? The Women's Land Army is to be disbanded in November, and in 1951 Committee labour will cease. From a recent statement by representative of the Ministry of Labour there is no prospect of emergency labour becoming available through Labour Exchanges in the near future.

No doubt many of the Women's Land Army girls will wish to continue on the land where they have proved both keen and efficient, and very happy in their work. Unless good accommodation can be found to replace the hostels in which they now live, many well-trained girls will be lost to the industry. The Minister of Agriculture recently stated that consideration will be given during coming months to this problem, so as to ascertain whether any special provision should be made for the welfare of ex-Women's Land Army members who remain on the land after 1950, but the matter is one of urgency, for both hostels and cottages will be needed. At the present time building by private enterprise is forbidden, and in many districts the allocation of Council houses for agricultural workers is unsatisfactory. It is really essential that licences be granted speedily for building agricultural hostels and cottages which will be additional to the quotas allocated to local authorities, of course, subject to the support of the County Agricultural Executive Committees acting for the Ministry of Agriculture.

CONCLUSION

Distribution and Marketing.—Within the industry there is a wide divergence of opinion on distribution and marketing. It is, perhaps, pertinent to recall that in 1920 the Linlithgow Committee's report on Covent Garden did not reveal any exorbitant profits in distribution. In any case, it is impossible to envisage the introduction of a comprehen-

sive marketing scheme to include all produce, since in the vegetable sector alone there are some 45 types in common use, and each type may embrace 10 varieties. If we limit the varieties to 6 grades we have the unworkable figure of 2,700 different commodities in the vegetable sector alone. The inclusion of the fruit and flower sectors would, in my considered opinion, reduce the inauguration of a single scheme to an absurdity. Nor should it be overlooked that, behind the system of marketing which has been gradually evolved by trial and error under private enterprise through the last 100 years, there lies the governing factor that vegetables are of a highly perishable nature and a certain percentage of purchases by the retailer must as a rule be written off. Any dynamic change of method would result in chaos; much more would be achieved by improved methods of transport. Any alterations in the present system of distribution should be gradual, but central markets must be retained at key points to serve the industry as general marshalling yards for the whole range of produce.

It is really far wiser to pin our faith to education, research, and advisory work than to rely on compulsory and arbitrary control of marketing boards. High quality produce must be grown before it can find its way into packages, and as a general rule a grower producing high-grade produce is a good packer, provided always—and the proviso is important—he can obtain the requisite materials. During recent years we have witnessed development of voluntary collective organizations to assist with grading, packing, and distribution, especially in the fruit sector. They have brought benefit to all concerned, and similar organizations are now being established for vegetables in areas where there is heavy production, such as in Cornwall and Hampshire. These admirable schemes are so much nearer to the natural instinct of a husbandman than dictation or arbitrary controls, and they provide the small grower with services similar to those enjoyed by the large grower.

Another recent and happy development has been the large displays of produce and sundries. The Western Commercial Show at Penzance was the pioneer, followed by the Early Market Produce Show, held annually by the Royal Horticultural Society at Vincent Square, and later by the Market Produce Show at Southampton. These shows are of great educational value to the grower, while the consumer has a visual demonstration of what British produce is available and how high a standard it can attain.

Transport.—Service given by the railways in transport of perishable produce was improving year by year until the war. It was possible to load on fast goods trains in London during the early afternoon for delivery in the Northern and Scottish markets before 6 A.M. the following day, and direct and rapid services were available from such areas as Cornwall. Now, unfortunately, produce is often 48 hours old when offered for sale, and in many cases growers have had to resort to costly passenger services or road transport in order to ensure delivery in the early morning of the following day.

Political arguments have been avoided in this paper so far, and attention has been focused on the compelling need for the dissemination of expert knowledge in every sphere of activity from the seedbed to the

market and on the deterioration of railway transport, but one aspect of our present quandary must be underscored. This is the deliberate depression of prices for home-grown produce by the importation and dumping of continental fruit and vegetables, often when home-grown produce is in abundant and cheap supply. The British grower neither receives nor seeks subsidies; indeed under recent legislation he is subject to all the penalties imposed upon farmers, but he receives few of their special privileges. It is pertinent to recall that wages in this country are 16 per cent. to 20 per cent. higher than those prevailing on the Continent of Europe. The Industry benefited much from the 1930–31 tariffs without any increase in the cost of the produce to the public.

What remedies can we suggest for the many and accumulating ills from which the horticultural industry is now suffering? Briefly we may summarize them in the following recommendations:

1. On the outbreak of war in 1939 a Horticultural Advisory Council was set up by the Ministry of Agriculture to advise on matters of national importance. It was composed of scientists and representative members of all sections of the Horticultural Industry, under the chairmanship of DR. H. V. TAYLOR. It did much useful work and, at the last meeting before being dissolved by the present Minister, prepared the outline of a transitional policy to be pursued on the cessation of hostilities. Some comparable body should be set up at once to advise the Ministers of Agriculture and Food at the present critical time.

2. There should be far closer co-operation between the Ministries of Agriculture and Food. The vital need for readjusting the foundations of Government policy was stressed in two recent debates on horticulture in both Houses of Parliament, but no remedial action was taken.

3. The same relative measure of protection against the dumping of foreign produce should be given to the industry as before the war.

4. Every support should be given to development of co-ordinated collective organizations in all districts where there are many small growers. This would provide them with many facilities now only available to large growers and lead to greater uniformity in growing and packing.

5. A development commission should be set up composed of producers, distributors, and consumers to encourage the processing of home-grown fruit and vegetables. Such a body should be empowered to make mass contracts between small growers and factories.

6. Research and advisory work should be speeded up and increased educational facilities should be organized. In addition to other matters much research is needed about horticultural tools, appliances, and machinery.

7. Grading and packing materials similar to those available to continental growers should be supplied to British growers.

The time allotted has been too brief for touching on anything but the fringe of this vast subject. We have alluded to the importance of

the industry; its achievements under the stress of war; its future needs; the benefits it has received from modern science; its hopes and its fears, but we are always brought back to acknowledgment of four laws which have controlled husbandmen throughout the ages and will continue to do so. They are age-old and fundamental, and no man shall gainsay them:

Time—day and night.
Sweat and toil—seed time and harvest.
Change—summer and winter—cold and heat.
Faith—these things shall not cease.

CYCLAMEN PERSICUM

F. Streeter, V.M.H.

THE group of *Cyclamen persicum* exhibited at the Annual General Meeting was first started from three corms sent home to Petworth by LADY LECONFIELD from Cyprus during her visit there in 1925. They were quite small and shrivelled. They were put into small 3-inch pans containing four-fifths brick dust and one part loam and placed in a cold frame. No water was given until the first sign of growth was noticed, then they were shaken out and replanted into the following compost: 2 parts loam, 1 part flaky leaf-soil and 2 parts sand with a sprinkling of charcoal; their growth in a coldhouse was rapid and the markings on the foliage were all different. On November 1 the first flowers opened and they continued up till March. The smallest flowers were pollinated and about 20 pods set. They then gradually died down and the plants were placed in full sun on a shelf in a Nectarine house where the ventilators were seldom closed and the plants were kept absolutely dry, as the lights were lowered during rain; they were baked for about 12 weeks. In the meantime the seeds had ripened and were sown immediately; it takes a good long while for them to burst and it is best to place a sheet of kitchen paper under the pots so that no seed is lost, in case you are not quite quick enough to notice them. Sown in pots 2 inches apart in sandy soil they take about one month to germinate and during the first week in November they are ready for pricking out, about 48 in a seed-box. They grow very quickly. There was no heat as it was impossible to give them any owing to so many house plants being required and they had to be moved about wherever there was room in the fruit houses. They were then transferred to small pans from 3 to 5 inches in size; they seldom require anything larger for several years and then only when the corm becomes too large for the pans. The three originals are still here and in 6-inch pans and they carry up to 200 flowers at a time; we have counted over 300 and buds to come. (Figs. 89 and 90.)

They are charming little plants and very sweetly scented, in fact, when passing by a house of them in flower it is quite strong. It is one of the few strongly scented plants these days, even surpassing the

Freesias. By keeping and selecting the smallest flowers for seed producing, one keeps that lovely daintiness. We have crossed the large greenhouse types with them to try to get the scent. You get it all right, but cannot maintain it. It also does well planted out in sheltered places in the pleasure grounds, where the markings on the leaves are most pronounced,—and what a plant for the Alpine House!

After last season's very hot sun and the baking they got, I am sure this is the treatment they require. With all the other work, we could not possibly spare the time to water them, even if we wanted to, but they stand it. They form a lovely contrast to the others and do not suffer from damping buds and yellowing leaves and they are just the plant to stand indoors for a fortnight, then out in the cold house for another period, and thus you can use them again and again. They get no feeding and are never coddled and the corms go on year after year. The plants shown were all ages, from the three originals down to last year's seedlings and you get many shades of colouring. Pests do not trouble them, not even that beastly white maggot, which among their big brothers so often causes good plants to collapse. I do not know what the hybridist would do with them, but I certainly think their beauty lies in their easy production, daintiness and their scent. Just the type of plant for a very busy man who dislikes failures.

EUCALYPTUS IN THE BRITISH ISLES

D. Martin

SENIOR RESEARCH OFFICER, COMMONWEALTH OF AUSTRALIA SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION, TASMANIAN REGIONAL LABORATORY

WHICH of the great number of species of Eucalyptus are likely to prove hardy enough in parts of the British Isles to be worth planting here? Perhaps I can contribute to the answering of that question; for, as a research worker in Tasmania and Australia, I have studied these plants in the wild, and I have lately had opportunities of enquiring into the results of some of the principal experiments in growing Eucalyptus which have been made in the British Isles during the past century.

One of the results of COOK's second voyage in 1774 was the introduction into Europe of *Eucalyptus obliqua*, by FURNEAUX of the "Adventure." Probably FURNEAUX found this species and *E. globulus* at Adventure Bay, Bruni Island, Tasmania.• By 1829, *E. globulus* was in cultivation in Europe. At Tresco Abbey in the Isles of Scilly *E. globulus* was introduced about 1838.

The oldest Eucalyptus I know of in the British Isles is the famous *E. whittinghamensis*, a form of *E. Gunnii*, which was raised from seed brought from Tasmania in 1846 by MR. JAMES M. BALFOUR of Whittinghame, E. Lothian. (Fig. 105.)

• See Aiton, *Hortus Kewensis*, 1789.

In the seventies and eighties of the nineteenth century there was a vogue for the planting of *E. globulus*, due partly to the fact of its extraordinarily rapid growth, partly to the erroneous belief that the tree and its extracts had anti-malarial properties. Great numbers were planted in the Mediterranean area, and the vogue spread to Britain. One planted as early as 1857 survives at Garron Tower in N. Ireland. Many other species, too, were tried by enterprising gardeners during the last quarter of the century, notably by the EARL OF ANNESLEY at Castlewellan, Co. Down, by MR. ROBERT BIRKBECK at Kinloch Hourn, Inverness, by MR. EDWARD RASHLEIGH at Menabilly near Fowey; at about the turn of the century they were being planted by MR. WALPOLE at Mount Usher, Co. Wicklow, at Tresco Abbey in the Scillies, at Poole in LADY ROCKLEY'S garden, in COLONEL STEPHENSON CLARKE'S garden at Borde Hill, Sussex, and many other places.

Out of the twenty-four species that were started at Castlewellan in 1876, the following survived in 1949:—*E. urnigera* (80 feet), *cordata* (60 feet), *Gunnii* (60 feet). *E. coccifera* had survived the frosts but had lately been blown down.

The experience of MR. BIRKBECK with his plantings at the head of the grim Kinloch Hourn was recorded over forty years ago in ELWES AND HENRY'S *Trees of Great Britain and Ireland* (p. 1019). I have not been able to examine the grounds thoroughly, but during a brief visit I noted *E. Johnstoni*, *coccifera*, *urnigera* and *Gunnii* flourishing in quantity.

At Menabilly, the once rich collection made by MR. RASHLEIGH has been so neglected that survivors are hard to examine in the jungle, but I noted *E. coccifera*, much broken by gales, and *E. gigantea*, cut by frost.

At Rostrevor, survivors include *E. coccifera*, *cordata*, *subcrenulata*, *urnigera*, *vernicosa*, *ovata*, and a remarkable plant provisionally called *E. biangularis*, probably a rare intermediate between *globulus* and *urnigera*.

At Mount Usher MR. E. H. WALPOLE has been remarkably successful with a number of species, especially *E. urnigera* and plants raised from Tasmanian seed in 1895 under the name *E. Muelleri*. *E. urnigera* has reached 120 feet, and was uninjured by frosts of 6° F.

Trees of the so-called *Muelleri*, 100–120 feet high, were cut but not permanently damaged by 6° F. Actually, this plant appears to be a form of *E. subcrenulata* (with some characters of *E. urnigera*). Other thriving species at Mount Usher include *E. gigantea*, 90 feet high, hardy to 6° F.; *pulverulenta*, cut by 6° F. but recovered; *viminalis*, over 120 feet, defoliated by severe frosts but not killed; *coccifera*, hardy, 20–80 feet; *virgata*, cut to the ground but not killed by 6° F.; *Stuartiana*, 120 feet, hardy to 6° F.; *Delegatensis*, 90 feet, hardy to 6° F.; *globulus*, hardy till the frosts of 1940–41. 22° F. sufficed to kill *E. ficifolia*, *Macarthuri*, *obliqua*, *polyanthemos* and *regnans*.

Having considered these and many other trials in different parts of the British Isles, I will attempt a rough classification according to hardiness. I must point out, however, that resistance to frost depends very much upon site and soil. Few Eucalyptus can stand a wet soil; and the notable successes at Mount Usher are probably due largely to a well-drained gravelly soil as well as to good cultivation and kindly climate.

In the first category for hardiness I put *E. vernicosa* (but it is a dull plant); *E. niphophila*; perhaps *E. parvifolia* (which survives at Winchester, Borde Hill and West Kirby but not at Kettering); and *E. Gunnii* in one of its hardier polymorphs such as *whittinghamensis* or a montane form. The tolerance of this species for wet soil increases its usefulness; but its timber is poor, its growth comparatively slow, and its root system is shallow so that it is apt to blow over when young. *E. Gunnii*, in one or other of its forms, flourishes in many parts of the British Isles, and makes a handsome small tree even in the trying conditions of Kew Gardens and in the severe climate of the Cotswolds. Particularly successful are the extensive plantings made by MR. BATEMAN of Brightlingsea, Essex, who obtained seed in 1887 from Negrete in Argentina. The original tree known as *E. whittinghamensis* is a variant of *Gunnii*, showing some *E. urnigera* characters; it combines an enhanced tolerance of frost with *Gunnii's* tolerance of wet soil. Its progeny, now in the third generation, vary somewhat in hardiness. In some of the seedlings the fruit closely resembles that of *urnigera*; in some it is like that of *E. divaricata*. The Whittinghame form is hardier than the typical *Gunnii*. At Kinloch Hourn, for instance, *Gunnii*, *coccifera* and *urnigera* were all injured by the zero frosts of 1894–95, during which the sea loch was frozen for two miles, whereas *whittinghamensis* (together with *E. vernicosa* and *E. alpina* from Mount William, Victoria) were unhurt.

In the second category for hardiness I put *E. coccifera*. This species may be expected to survive 5° F., or even 0° F., if raised from seed of a hardy form and if grown on well-drained soil. It grows straight and fast in sheltered sites, but remains dense and bushy in severe exposures such as Zennor Moor in West Cornwall. As MR. T. SMITH noted at Daisy Hill, Newry, it is tough enough for windy climates. It is one of the survivors of many of the early plantings, e.g. at Rostrevor, Menabilly, Kinloch Hourn, Borde Hill, Glasnevin. A well-known specimen at Powderham Castle, near Starcross in S. Devon, was 70 feet high in 1898, and in 1949 this still stands, though lightly cut by the frosts of 1946 and 1947. Its fruit preserved at Kew, shows some *E. gigantea* characters. At Wisley, the 1946–47 frosts defoliated but did not kill a tree 20 feet high; they killed, I believe, the beautiful group on the slope at Killerton, near Exeter. It is worth persisting with trials of this species, for it is very decorative in leaf and habit and pretty in flower when it bears freely its milk-white fuzzes.

Thirdly, I classify *E. urnigera*, *subcrenulata* and *Johnstoni* as being almost as hardy as *coccifera*; in favourable conditions these are likely to stand 5° F. or 6° F. At Mount Usher, *urnigera* is 120 feet high, at Castlewellan 80 feet; it survives too at Kinloch Hourn, Rostrevor and Glasnevin, though at Edinburgh Botanic Garden a large tree was killed in 1940. It is a faster grower than *coccifera*, and so are *Johnstoni* and *subcrenulata*. The notable trees at Mount Usher which were raised from Tasmanian seed in 1895 under the name of *E. Muelleri* are really *E. subcrenulata*, influenced by *E. urnigera*. They have reached 100–120 feet, and though cut by 6° F. were not permanently damaged.

E. Johnstoni is evidently one of the species that should be more widely tried. It is a large-fruited type of *subcrenulata* and thought

by MR. R. G. BRETT, the Australian authority on Eucalyptus hybrids, to be a stabilised cross with *E. globulus*. This would account for its rapid rate of growth. At Kinloch Hourn it is (so far as my brief examination indicated) the most thriving species. Fig. 106 shows part of one of the many specimens—a tree at least 80 feet high, 8 feet in circumference at the base. These are very handsome trees, with rich glossy foliage and orange-coloured young bark.

In a fourth category come *E. pauciflora*, *gigantea*, *rubida*, *aggregata*, *cordata*, *Dalrympleana*, *ovata* and *cinerea*, which have survived 10° F. *E. viminalis*, *Macarthuri*, *pulverulenta* and *resinifera* should survive 15° F.

E. niphophila, growing at Charlotte's Pass in Tasmania which is closely related to *E. pauciflora*, stands —8° F. there. The plants grown in England seem to be less frost resistant; perhaps they were raised from seed collected at too low an altitude. There is a small tree of *E. niphophila* at Edinburgh Botanic Garden.

E. gigantea has been a notable success both at Mount Usher and at Rowallane, Co. Down. This has stood 6° F. at Mount Usher, but its safe range is probably above 10° F. It makes a handsome upright tree, with timber of outstanding quality, and foresters would do well to try to establish stable hybrids of this species with a high standard of hardiness, such as *E. coccifera-gigantea* and *E. subcrenulata-gigantea*, which are common in Tasmania.

E. Dalrympleana (in a form influenced by *gigantea*), as well as *gigantea* and *Gunnii*, thrives at Willaston, Cheshire, having survived the 1947 frosts.

In a fifth category I lump together *E. globulus*, *obliqua*, *regnans*, *Perriniana*, *Cambagei*, *linearis*, *amygdalina*, *rostrata*, *saligna*, *Risdoni* (?), *tasmanica* (?) and *Sieberiana*. These stand 15–20° F.

Till the frosts of December, 1938, and January-February 1949, there were many trees of *E. globulus* in West Cornwall; and many of these, after being apparently killed, made a remarkable recovery. Very few of these have survived the 1947 ordeal; and gardens which had long enjoyed or endured the presence of these trees with their greedy roots, their huge picturesque trunks, and their litter of loose bark and dead leaves, have been faced with a formidable problem of removing the standing corpses.

The group that will stand 20–25° F. comprises *E. leucoxylon* and *Lehmanni*. The first of these, with its beautiful red flowers, can serve as a hardier substitute for the brilliant but tender *E. ficifolia*.

Finally, in the 25–30° group, come *E. ficifolia*, *sideroxylon*, *sepulchralis*, *Groesa*, *caesia*, *Forrestiana*, *Preissiana* and *torquata*. *E. ficifolia*, in its scarlet flowered form, is one of the most spectacular flowering trees in the world; and it has flowered at Penzance and in the woodland at Tresco Abbey in the Scillies. A plant of it has, I believe, survived the 1947 frosts close to the sea at Mount Stewart, Co. Down. But it is, of course, too tender for any but the devoted experimenters in the most favoured gardens of the British Isles.

Thus, after a century of experiment, it seems safe to make these two statements about the growing of Eucalyptus in the British Isles.

Firstly, there are a fair number of species which are of high decorative value and of sufficient hardiness to be worth planting in well-drained soils in some or many parts of the country.

Secondly, there is a good prospect that some Eucalyptus species or hybrids can be found or produced, which would find a useful place in the country's forestry. Few of the species cannot be crossed; the hybrids can, it seems, be stabilised quickly; and it should be possible to combine the qualities of frost resistance (such as that shown by trees at the tree-limit on Mount Kosciusko) with the qualities required by the timber-cutter.

My grateful thanks are due to MR. W. ARNOLD-FORSTER for much assistance in the collection of information and for the preparation of the manuscript in a form suitable for this JOURNAL.

I would also like to record my thanks to all those who so freely supplied me with information about their trees.

LILIUM SHERRIFFIAE, A NEW HIMALAYAN LILY

William T. Stearn

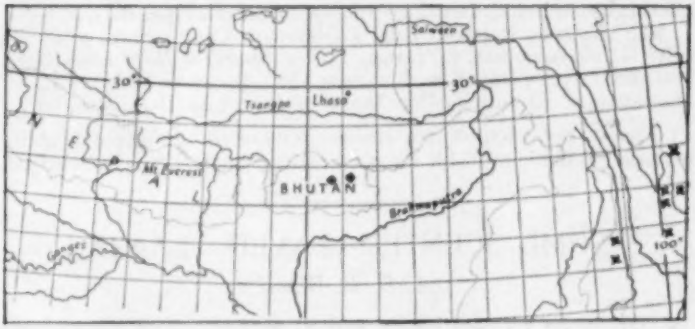
BHUTAN is a little-known Himalayan state which has long had an alluring reputation as forbidden territory. WILLIAM GRIFFITH collected plants there in 1837 and 1838, MR. ROLAND EDGAR COOPER in 1914 and 1915*, SIR BASIL GOULD from 1938 to 1944, but the greatest additions to our knowledge of its rich and varied flora have been made in recent years (1933, '34, '36, '38, '47 and '49) by MR. FRANK LUDLOW and MAJOR GEORGE SHERRIFF latterly assisted by MRS. SHERRIFF and DR. JOHN H. HICKS who accompanied them in 1949. Their big 1949 collection of herbarium specimens is now in course of identification at the British Museum (Natural History), London, S.W. 7. Seeds and bulbs gathered at the same time have been generously distributed to many gardens and should yield some interesting and beautiful new plants during the next few years. These include a remarkable undescribed species of Lilium.

A solitary plant of this Lily was found in bloom by MRS. SHERRIFF and DR. HICKS on May 31, 1949, near Lao. It grew in rather sandy soil among low willows on the bank of a stream at 9,000 feet (2,743 metres). The nearly 2 feet high stem, with sparse linear or linear-lanceolate foliage, carried a solitary flower which MRS. SHERRIFF remembers as being funnel-shaped and horizontally poised; her field-note describes its colour as "maroon with inside of corolla chequered with gold."

* COOPER, R. E. "Botanical tours in Bhutan" *Notes R. Bot. Gdn. Edinb.* **18**. 66–118 (1933); "Notes upon Bhutan in the Eastern Himalaya" *J. R. Hort. Soc.* **74**. 68–75 (1949).

† FISCHER, C. E. C. "New plants from Bhutan and Tibet" *Kew Bull. 1939*. 663–666; "Contributions towards a flora of Bhutan" *Kew Bull. 1940*. 158–160. Sir Basil's plants now in the Kew Herbarium were collected in Western Bhutan on the route Yatung-Ha La-Bumthang, and Ha via the Tremo La to Phari in Tibet.

This tessellation can be clearly seen in the dried specimen (L.S.H. 20655; Fig. 108). The related *Lilium Bakerianum* var. *Delavayi* (figured in *R. Hort. Soc. Lily Book Year* 13, Fig. 2: 1949) of Western China has a perianth variously mottled and spotted with dark reddish-purple on a dull greenish-yellow background, but the more regular patterning of MRS. SHERRIFF's Lily is better compared with that of the Snake's Head Fritillary (*Fritillaria Meleagris*) and various Colchicums. The hazards of plant-collecting are illustrated by an accident which befell MRS. SHERRIFF not long after the discovery of the plant. She broke her arm through a fall among rocks and had all the discomforts of a six weeks' journey over rough mountain tracks and wild country back to Bengal. E. H. WILSON suffered a rather similar misfortune on the memorable 1910 expedition which achieved the introduction in quantity of *L. regale*, his leg being broken by a falling rock in the wilds of Western China.



Distribution of *Lilium Sherriffiae* (✦) in Bhutan and *L. Bakerianum* var. *Delavayi* (×) *in* Western China.

Plants evidently belonging to the same species as that of Lao were later found by LUDLOW and SHERRIFF at 12,000 feet (3,658 metres) by the Dhur Chu near Bumthang (the present-day capital of Bhutan) about 50 miles west of Lao and due south of Kulakangri. Here they occurred abundantly in a very small area and were known to the local inhabitants under the name "abĕcăs." The flowers of all but one had given place to immature capsules; this one flower was dark red-brown and not properly open. The plants grew either on an open grassy hillside or under trees on the banks of the river Dhur associated with species of Fritillaria, Cotoneaster, and Polygonatum. Weak specimens were about a foot high. Out of a hundred or so plants all, except one vigorous two-flowered individual 3 feet high, had borne only one flower each. In October 1949 LUDLOW and SHERRIFF returned to the place where they had found the plants in July and obtained a good supply of bulbs and seeds. The largest bulb measured 1½ inches across but most bulbs were about ½-inch across. It is hoped that they will enable the species to be established in cultivation. Meanwhile it seems desirable to record the characters of the plant as revealed by the herbarium material.

Lilium Sherriffiae *Stearn*; species nova cum *L. Bakeriano* var. *Delavayi* (Franchet) Wilson comparanda sed caule glabro, foliis glabris, floribus vero tessellatis, segmentis interioribus, oblongo-ellipticis, antheris linearibus distincta.

Bulbus anguste ovoideus, ochroleucus, c. 2–5[–3] cm. altus, *squamis* paucis anguste ovatis acutis. *Caulis* erectus, uniflorus vel raro biflorus, glaber, [35–]58[–90] cm. altus, sparse foliatus, basi radicans. *Folia* sessilia, dissita, c. [8–]15, linearia vel lineari-lanceolata, 6–13 cm. longa, 5–9 mm. lata, glabra, acuminata, multinervia. *Flos* horizontalis, infundibuliformis (fide Mrs. Sherriff), brunneo-ruber eximie aureo-tessellatus instar *Fritillariae Meleagridis*; *bractea* foliacea; *pedicellus* 2[–7] cm. longus. *Segmenta perianthii* ut videtur recta, oblongo-elliptica, c. 5·5 cm. longa, glabra, acuta, exteriora c. 1·8–2 cm. lata, interiora c. 2·3–2·5 cm. lata, *sulco nectarifero* brevi levi. *Filamenta* gracilia, c. 1·8 cm. longa, vix 1 mm. crassa, glabra, pallida; *antherae* lineares, post dehiscentiam c. 1·2 cm. longae, 1 mm. latae; *pollen* aurantiacum. *Ovarium* cylindricum, c. 1 cm. longum, 2·5 mm. diametro; *stylus* clavatus, c. 2·8 cm. longus, glaber; *stigma* leviter lobatum c. 3 mm. latum. [Measurements in square brackets are taken from specimens other than the type.]

Hab. EASTERN BHUTAN: Lao, Trashiyangsi Chu, approx. 91°28 E., 27°51 N., alt. 9,000 feet, 31. v. 1949, *Ludlow, Sherriff & Hicks* 20658 (Herb. Mus. Brit.; typus); Dhur Chu, Bumthang Chu, approx. 90°37 E., 27°44 N., 12,000 feet, 22. VII. 1949, *Ludlow, Sherriff & Hicks* 1949 (Herb. Mus. Brit.).

The co-operation of DR. GEORGE TAYLOR in making the above material promptly available for examination is gratefully acknowledged.

SOME SCENTED-LEAVED PLANTS

A. D. B. Wood

A LIKING for pleasant scents, and an appreciation of the aromatic fragrance of gums and leaves has probably existed from the time when primitive man discovered that beside giving warning, or conveying attraction, his sense of smell could provide him with deliberate pleasure. The use of these scented materials was certainly well established in the great civilizations of the ancient world. In the hanging gardens of Babylon there were fragrant trees; frankincense and other gums were used in Egypt; in Greece some of the priests chewed Bay leaves to inspire them to prophecy, and myrtle was mixed with their wines and love potions.

In England many aromatic plants are referred to in the herbals and elsewhere, generally for use in the kitchen or in medicine. The sprigs of Rue and Rosemary presented to the judge at the Old Bailey trace back to the days when they were intended to ward off gaol-fever, or as DR. HAMPTON (1) has suggested, the bugs and lice which carried the fever. Our imagination is touched by the economy of phrase in this passage from the herbarium of APULEIUS:—"If any propose a journey, then let him take to him in hand, this wort, Artemisia, then he will not feel much toil on his journey.' But the contemplation of these matters is brought to an unexpected level, when JOHN EVELYN describes as "one of the most agreeable of all the herbaceous dishes" . . . "violet leaves at the entrance of spring, fried brownish and eaten with orange or lemon juice and sugar."

The function of scent in flowers appears in most cases to be to attract

Photos, J. E. Downward

FIGS. 89, 90—*Cyclamen persicum*. A fine exhibit for which a Gold Medal was awarded to LORD LECONFIELD at the Show on February 14, 1950. These plants were raised from three corms sent from Cyprus in 1925 (See p. 185)

Photo, Sport & General Press Agency Ltd.

FIG. 91—General view of layout, wells, pumping shed and storage reservoir in foreground, of MR. F. A. SECRETT'S horticultural holding at Milford, Surrey (See p. 177)

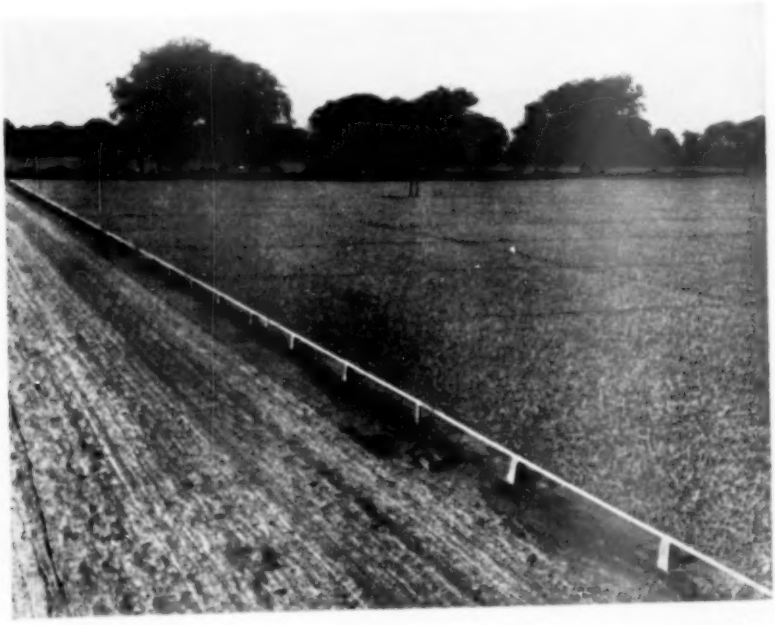


FIG. 92—Mains supported on concrete dollies, fitted with valves 35 feet apart (See p. 177)

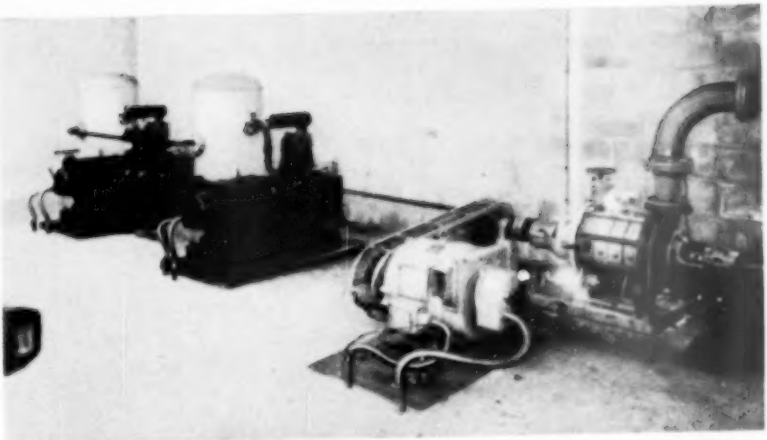
Photo, Fox Photos Ltd.

FIG. 93—Radishes being gathered in February. Early crops help to pay wages throughout the year and give the grower prestige. (See p. 177)

Photos, Fox Photos Ltd.

PRESENT-DAY PROBLEMS OF THE HORTICULTURAL INDUSTRY

FIG. 94—Capital expenditure can be of no value unless hand labour is available in quantity for harvesting the produce. (See p. 182)



Photo, Malby

FIG. 95—Interior of engine house, on left electric motors and compressors for air lift from the wells, on right motor and four-stage centrifugal pump for supplying and boosting the water to the mains (See p. 177)

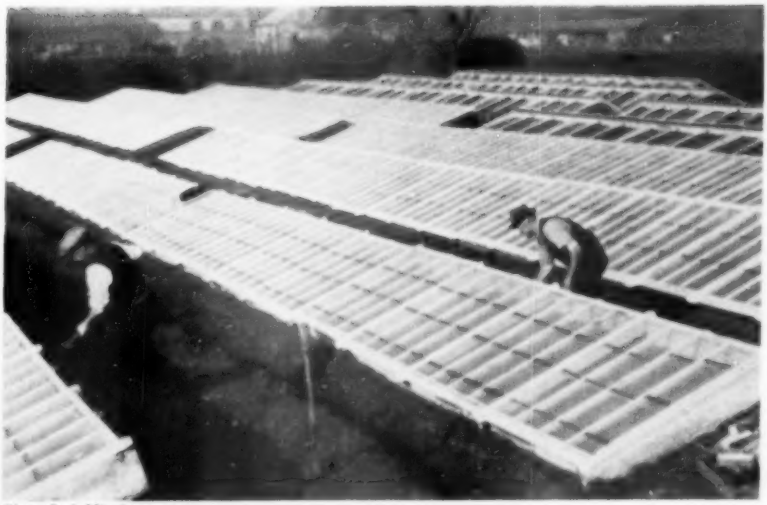
Photo, Fox Photos Ltd.

PRESENT-DAY PROBLEMS OF THE HORTICULTURAL INDUSTRY

FIG. 96—Work on Tomatoes in greenhouses which should be a part of an intensive holding (See p. 176)

Photo, Fox Photos Ltd.

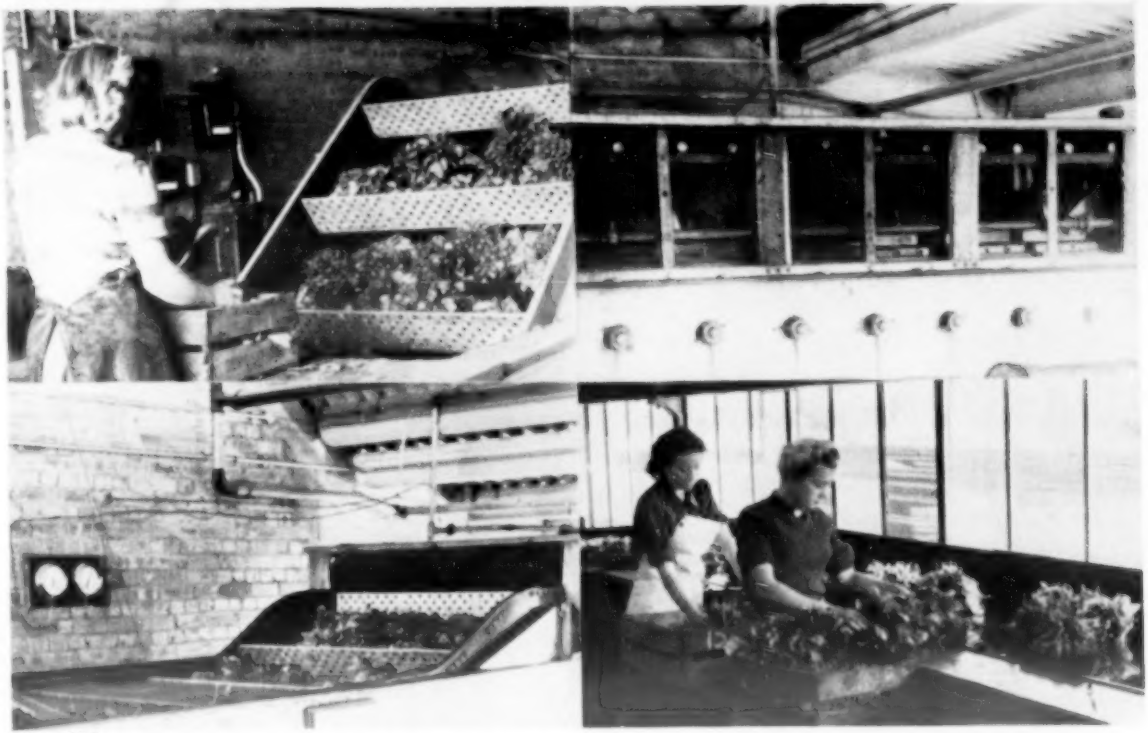
FIG. 97—Dutch lights layout (See p. 177)



Photo, Jack Minnitt

PRESENT-DAY PROBLEMS OF THE HORTICULTURAL INDUSTRY

FIG. 98—English lights as used in the past; in the background newer Dutch lights which admit more light (See p. 177)



Photos, Malby

PRESENT-DAY PROBLEMS OF THE HORTICULTURAL INDUSTRY—*WASHING MACHINE*

FIG. 99 (top left)—Girl loading conveyor belt with bunches of Radishes

FIG. 100 (bottom left)—Conveyor belt passes through bath in which water is agitated

FIG. 101 (top right)—Conveyor belt than passes through spraying chamber. Sprays are vertical and horizontal

FIG. 102 (bottom right)—Vegetables are delivered direct on to a rubber belt and packed where two girls are engaged packing

This machine saves the work of 20 girls (See p. 176)

FIG. 103—Ploughing and subsoiling at Milford with teams of horses. One pair ploughing 11–12 inches deep, the pair following subsoiling a further 6 inches (See p. 177)

Photos, Malby

FIG. 104—David Brown Tractor carrying out same operation to same depth as done by four horses (See p. 177)

FIG. 105—*Eucalyptus Gunnii*. Original tree at Whittinghame Castle; planted 1846. (See p. 186)

EUCALYPTUS
IN THE BRITISH ISLES

FIG. 106—*E. Johnstoni* at Kinlochbourn, Inverness. (See p. 189)

Photo, B. O. Mulligan

FIG. 107—White-bark Pine (*Pinus albicaulis*) on left. Tree 45–50 feet tall, near Mt. Stuart, Cascade Mountains, Washington. Altitude 5,500–6,000 feet. (See p. 197)

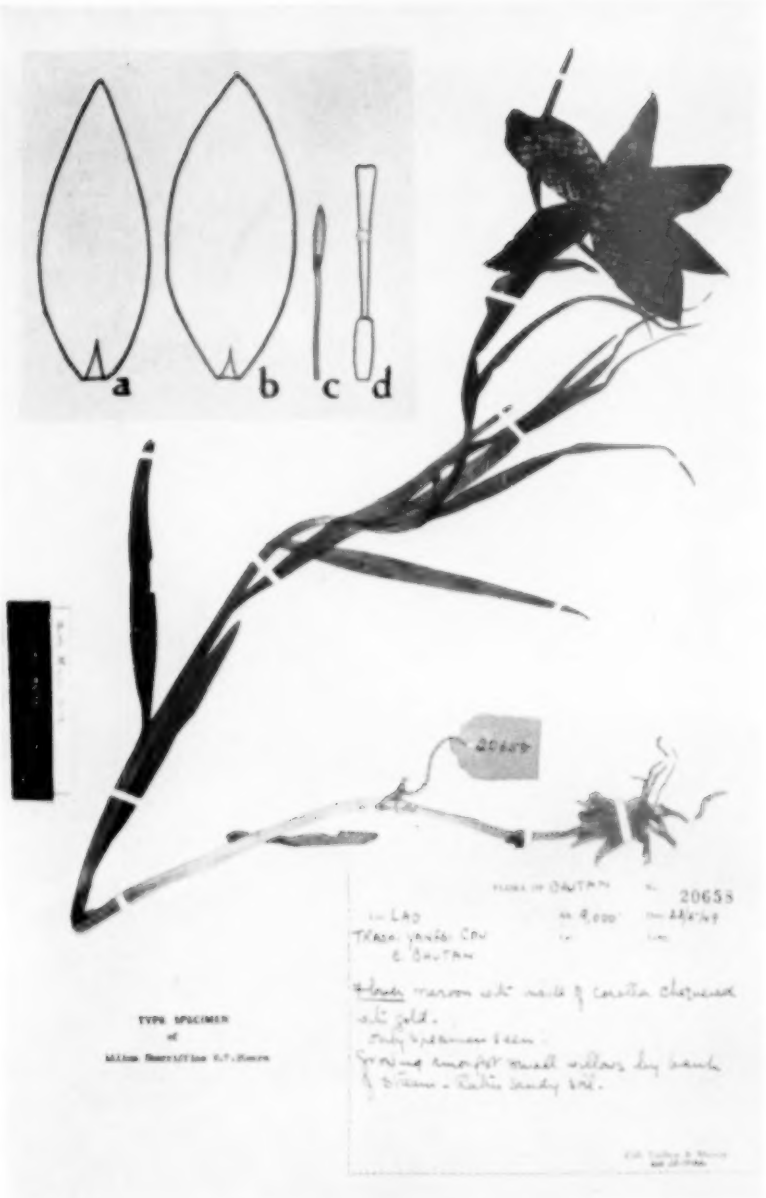


FIG. 108.—Type-specimen of *Lilium Sherriffiae* Stearn in Herbarium of British Museum (Natural History): inset diagram, *a* outer perianth-segment, *b* inner perianth-segment, *c* stamen, *d* ovary and style. (See p. 190)

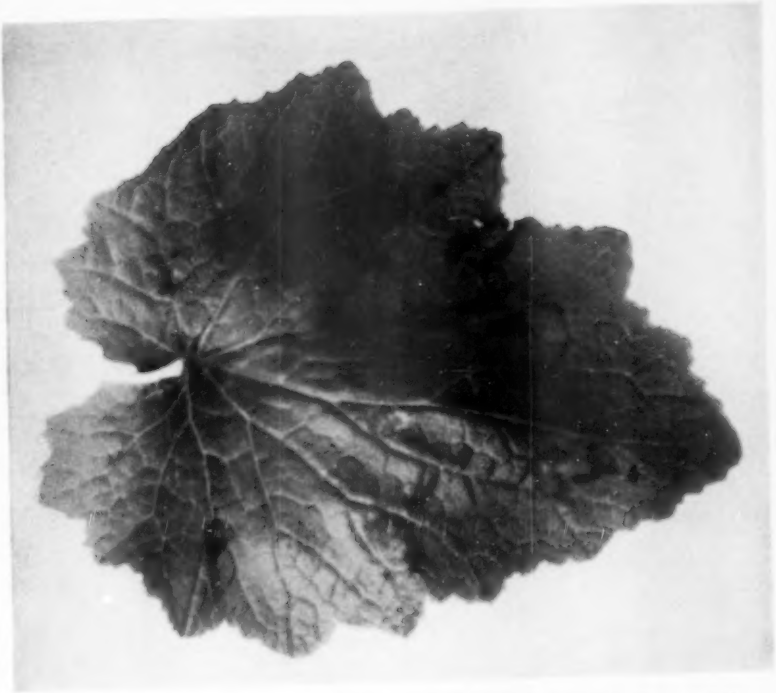


FIG. 109—Leaf Spot Disease of Cineraria, *Alternaria senecionis* (See p. 199)

AWARD OF GARDEN MERIT

FIG. 110—*Viburnum bitchiuense* (See p. 211)

Photo, N. K. Gould

FIG. 111—*Anemone Pulsatilla*

WISLEY IN SPRING

FIG. 112—*Pieris japonica* in March

insects. In the case of leaves it is probable that those scents which DR. HAMPTON calls flower-like are intended also to attract insects when the flowers themselves are scentless—as in the Rose-leaf Geraniums. But it seems that the non-flower-like scents in leaves such as Rosemary and Bay are intended to act as deterrents to harmful insects and to browsing animals. There is also a theory that the aromatic vapour floating above the plants forms a protective atmosphere against the rays of the sun, and certainly many of the aromatic plants are to be found growing wild in hot dry situations, notably in the Mediterranean region—which in turn may explain why such plants as Myrtle, some of the Lavenders and Cistuses, Rosemary, Bay and some of the Sages are not entirely hardy in this country.

Of those aromatic plants usually grown outdoors in the garden, the one that comes first to mind is the favourite Lemon Verbena, *Lippia* (*Aloysia*) *Citriodora*, a native of Chile, and first brought to this country in 1784. Like many other scented-leaved plants it is markedly tender, and in the South of England requires the protection of a wall, and even then may be cut in hard winters. In my garden in Berkshire there is a plant which at three years old has reached a height of seven feet, and has a woody stem nearly two inches in diameter. In the autumn of 1948, wishing to protect it for the winter, I had it enclosed by hessian, stretched round tall stakes. In an excess of anxiety (for the winter proved to be one of the mildest recorded), I had certain other plants on the same wall covered in a similar way. Depending on the size and span of the plants these winter wrappings took on strange appearances, some aloof and monolithic, others squat and lowering, so that in the half light of winter evenings, they looked like a row of watchers, standing silent. and a little sinister, against the house; There was also the occasional pleasure of taking a visitor through the garden door at dusk walking him down to the bottom of the garden, and turning round to indicate "my Henry Moores."

By thus enclosing my Lippia I acquired an unexpected harvest. The plant is deciduous, and mine being totally enclosed dropped all its leaves inside the hessian covering, so that a large bowlful was readily gathered, when the covers were taken off in the spring. The dead leaves seemed as strongly scented as when they had been alive, and only needed gentle agitation in the bowl to release the scent.

In spite of its tenderness, the Lemon Verbena is well worth growing, since if a casualty should occur in the winter, it can be replaced by a young plant from a pot, which will grow rapidly in its first season after being first put out against a warm wall. The plant strikes easily from cuttings in spring, and it is convenient to keep a sequence of young plants in pots in the cold green house, partly for their own sake, but also to replace any that may be killed outside.

The scent is not released without pinching the leaf, an action which breaks certain specialised cells containing the complicated volatile substances, collectively and loosely known as essential oils. DR. HAMPTON states that the substance giving the lemon scent is citral, and that in the lemon-scented Verbena, this citral is not the only element present, but is superimposed on a background of other perfumes.

In Lemon Verbena, and to some degree in some other plants, the lemon-scent as it were takes the solo part in a concerto, but it may also be present as a member of the olfactory orchestra, when some other element of perfume is taking the solo part, as for instance when geraniol picks up its bow to play the celebrated Rose Geranium Concerto.

Citral is present in lemon-scented Thyme, *Thymus citriodorus*, which with its brothers and sisters seem now to be less grown in gardens than they might be. Thymes are good to plant at the extreme front edge of a border and to encourage to creep over the band of stone paving which every border should have between it and the grass or gravel. Here they will grow happily in the sun, drawing the bees, and ready to be picked and pinched to give up their fragrance, one of the cleanest and most refreshing of all scents, and much used in the making of scented soaps. There is another creeper useful to encourage over the stone band at the front of the herbaceous border, *Artemisia pedemontana*, with grey foliage and a sharp teasing aromatic smell. *Artemisia abrotanum*, with its poignantly antithetic names of 'Old Man' and 'Lad's Love,' has a rough aromatic scent, and fine foliage which makes it worth including in a herbaceous border where, if it becomes too large, it can be cut down almost to the ground in the spring. Many of the Artemisias have grey foliage, some of very fine texture, notably the variety *Stellariana*, whose feathery greyness recurring in penetrating drifts down the border can point the rhythm with unerring precision.

Bergamot, once used mainly as a herb for the flavour of its leaves, can with advantage be planted in the herbaceous border. To my mind the best of the many slightly different Monardas which have recently made their appearance is 'Croftway Pink,' which when planted in drifts associates well with Artemisia and *Salvia virgata*.

There are many scented leaved plants in the large family of the Sages. One which is now used in herbaceous borders for its handsome flowers and bracts is a variety of the Old Clary, *S. sclarea* var. *turkestanica*, whose leaves have an unmistakable and pervading smell, which is never admired, but about which there is disagreement as to whether it is interesting or definitely unpleasant; it is a little reminiscent of Black Currants with, I think, a dash of the foxy smell of Crown Imperial, though MR. FOTHERGILL, in his *Innkeeper's Diary*, has another name for it. The leaves of Clary, when distilled, give off a muscat scent, which is an ingredient of perfumes, and has also been used to flavour some German wines.

Salvias, in whose leaves the characteristic smell of Sage is mixed with that of Black Currant leaves, are *Salvia Grahami* and its near *relation S. Greggii*. I have a dozen or so plants of *S. Grahami* on the south wall of the house under the dining-room window, where in the latter part of the summer they are sought out by humming-birds hawk moths. These plants are seldom without flowers from June until the frosts begin, and to me, one of their special virtues is the delicate balance which is maintained between flower and leaf. The amount of carmine-red bloom is very nicely proportioned in the bright apple-green foliage. These Sages grow to a height of about three feet; being natives of Mexico they are not strictly hardy here, though it is likely that they would survive a mild winter when grown against a south wall. Winter casualties need not in

any event be regarded very gravely, since the plant strikes readily from cuttings, and grows rapidly, reaching a height of from two to three feet in one summer, so that it can if necessary be treated as summer bedding.

The herb grown in kitchen gardens is the Common Sage, *S. officinalis*, but there is a lesser known and charming cousin, *S. lavandulifolia*, with a dwarfer almost prostrate habit, and bright sky-blue flowers of much beauty in the summer. The leaves are more pointed than those of the common herb, and when pinched, have a strong fragrance of Lavender overlaying the smell of Sage.

*S. coerulea** is a new plant to me, and experience of it is limited to rather less than a whole year. It is grown in a cool greenhouse where it seems to reach a height of about 3 feet. Its leaves have a smell of Sage, but its glory is in its deep blue flowers, which like those of *S. Grahami* are spaced with great elegance against the foliage. Another Salvia is *S. rutilans*, with pretty scarlet flowers and vivid green leaves which when pressed smell clearly and strongly of Pineapple.

If I had to make a list of scented-leaved plants known to me, and common in our gardens or greenhouses, I would place *Origanum microphyllum* second only to Lemon Verbena. This plant, sometimes known as Citronella, is a native of Crete, and not generally hardy in this country. The scent of the leaves has a great deal of Lemon about it, but it is sweeter, less clear cut and refreshing than Lemon Verbena. In the summer it can be put out into borders against the house, where rain or the use of the hose will sufficiently agitate the leaves to send the charming fragrance floating upwards through the windows. It strikes fairly easily from cuttings, and it is best to renew stocks each year, because as it gets older it tends to develop an ungainly habit.

There are two small Lavenders which are more tender than the common *Lavandula Spica*, and need the protection of a greenhouse: *L. dentata*, from the Mediterranean region, has pale lavender-coloured flowers, largely hidden by conspicuous bracts of a darker shade. The leaves are much toothed, of a dull green colour, and have a pleasantly bracing tang which sharpens the usual Lavender scent. Plants in the greenhouse grow to about one and a half to two feet in height; they can easily be propagated from cuttings. *L. multifida*, native of the Canary Islands, is a smaller plant, with lilac flowers and pale green downy leaves, with, again, a slightly astringent version of the Lavender scent.

Favourites of our grandmothers, but sadly neglected to-day, the scented leaved Pelargoniums are some of the easier and most rewarding plants to grow in a cool greenhouse. The ones that I grow are known to me by the names used here, but there has been confusion in nomenclature since ROBERT SWEET, in beginning his great book Geraniaceae in 1882, treated some garden hybrids as species, for instance he states that *Pelargonium Scarboroviae*, the COUNTESS OF SCARBOROUGH'S 'Storks-Bill' was raised from seeds in the collection of that lady, and goes on to say that it appears to be intermediate between *P. obtusilobum* and one of the Citron-scented kinds, noting that it had a pleasant Lemon scent.

*EDITOR'S NOTE—This is the plant to which an Award of Garden Merit was given in 1949. It is described on p. 210 of this part under the name *Salvia ambigens*. It is grown at Wisley as hardy plant.

There are at least two of the scented-leaved Pelargoniums which, besides being fragrant and ornamental in the greenhouse, can be put out with good effect in the summer. The first is *P. fragrans* which SWEET calls the Nutmeg-scented 'Storks-Bill' and notes that WILLDENOW describes it as a species, and native of the Cape of Good Hope, though himself considering it more probably a hybrid of *P. odoratissimum* fertilized with the pollen of *P exstipulatum*. It is sometimes known as *Geranium odoratissimum*, and has small whitish flowers with varying degrees of red or pinkish veining, the leaves are obtuse-cordate, faintly grey-green, carried daintily, with a fragrance in part reminiscent of Nutmeg, but with a background of other aromatic scents in which lemon and peppermint are discernible, and also something, possibly eucalyptol, from DR. HAMPTON'S camphoraceous group. This neat compact little plant looks very well in groups of three or five planted out in the summer to fill vacant spaces in the front of the herbaceous border.

The other plant for which I find good use outdoors in summer is one of the Oak-leafed Pelargoniums: *P. quercifolium major*; its scent is near that of the Rose Geraniums *P. capitata*, and *P. radula*. The main constituent is geraniol, with citral plainly discernible and also, to me, a suggestion of pinene, which it may be noted, is present in the glandular hairs of the Moss-Rose as well as in Pine needles. Small plants out of pots look well in front of my row of *Salvia Grahami* which, as they get older and survive successive winters, tend to develop bare legs and require something in front of them. Another use I have found for it outdoors is in the spring border. This is permanently planted with spring flowering shrubs, space being left for Daffodils in front, and in deep enclaves between groups of shrubs. In years when the Daffodils are not to be lifted, the Pelargoniums can be put out among them in late May or early June, and so disposed as to hide the dying Narcissus foliage. When the Daffodil bulbs are to be lifted in July, the Pelargoniums must be kept in their pots until the lifting is over, and will still make good growth and provide a fine effect before the autumn. *P. quercifolium major* is a vigorous grower and may reach two or three feet in a summer. Its finely cut foliage is exceedingly handsome, covering the bare ground, and introducing texture and contour into the monotony which in summer must of necessity overtake a spring border.

The other Pelargoniums to be referred to are kept in the greenhouse all the year. The curled-leaved 'Storks-Bill' *P. crispum* which SWEET describes as "leaves lemon scented or inclining to a scent of the balm . . . an old inhabitant of our greenhouses having been introduced from the Cape ever since the year 1774 . . . always forming a snug bushy plant." It grows tall and thin, fastigiate, like a tiny Cypress. It has a distinguished and less easily propagated cousin in 'Lady Plymouth' (*P. crispum variegatum*) gold and silver variegated with a similar fragrance in the leaves. Both these plants should I feel be capable of being put out in the summer with great effect, but I have not so far found a situation or surroundings to set them off to advantage.

The Southerwood-leaved 'Storks-Bill,' *P. abrotanifolium*, has delicate finely cut foliage with a strong scent like sweetened Southernwood. *P. graveolens* described by BAILEY (2) as having a rather heavy balsamic odour, smells to me chiefly of varnish.

'Attar of Roses,' and 'Godfrey's Pride,' are two of the Rose-leaf Geraniums with a preponderance of geraniol in their fragrance.

Two very distinct scents are encountered in *P. tomentosum* which is strong Peppermint, and *P.* 'Shrubland Pet' with its appetizing aroma of Parsley.

Scent is said to be apprehended in a primitive part of the human brain. Certainly a precise comparative analysis of it is unlikely ever to be formulated, and it is probable that its appreciation will always be subject to strong personal idiosyncrasy. I, for instance, have so far been unable to detect fragrance in Box leaves, and it is with admiration, therefore, that I read SIR GEORGE SITWELL (3) '. . . to find a proper epithet for the odour of the Box leaf, we should have to combine the adjectives warm, sweet, bitter, clean, aromatic'; and OLIVER WENDELL HOLMES on the Box bush 'which breathes . . . the fragrance of eternity, . . . for this is one of the odours which carry us out of time into the abysses of the unbeginning past.'

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NOTES FROM FELLOWS

The White-bark Pine

ON one mountain excursion last July into the central Washington Cascade Mts. we were able to see excellent examples of this species, *Pinus albicaulis*, at various levels between approximately 5,500 and 7,500 feet altitude.

While traversing a steep north-easterly snow slope on our way down to an inner valley between Ingall's Peak (7,600 ft.) and Mt. Stuart (9,470 ft.) we passed one magnificent old specimen (Fig. 107) standing beside a characteristic group of alpine fir (*Abies lasiocarpa*) on one of the "islands" then beginning to emerge from the snowfield, which in 1949 was much deeper and consequently remained longer than normally. This tree, or trees, had three distinct trunks twisted together, almost clear of branches for more than one-third of its total height, estimated at 45–50 feet. It was a most conspicuous specimen on this side of the valley, where the *Abies* and a flourishing colony of *Larix Lyallii* were predominant. On the opposite side, facing west or nearly so, many more pines were to be subsequently seen. At a point on the mountain-side around 6,500 feet the tree form changed to the shrub, and at the highest level reached by the pines, they were no more than tough, weatherbeaten bushed three or four feet high, eking out a lean existence on this steep and rocky slope in summer, covered by snow for probably eight or nine months of the year. Few woody plants go much higher than this pine, or above the 7,000 feet line, so far as we observed; *Potentilla fruticosa* and *Juniperus communis* var. *montana* are two that do so to some extent.

The ovoid, purple-brown cone is one of the most distinct amongst pines—hard, heavy, with thickened, blunt scales which never open in the normal fashion; the seeds are frequently extracted by squirrels or perhaps other animals or birds, and of this habit we found plenty of evidence, though we saw none of the depredators at work. The wing of the seeds also remains attached to the cone scale when the cone finally disintegrates.

This indehiscent cone and wingless seed, combined with leaves in clusters of five, places it in close relationship with the Swiss Stone Pine (*P. Cembra*) and *P. pumila* from N.E. Asia, but like the latter *P. albicaulis* appears to be exceedingly rare in gardens in Britain; Borde Hill and Dawyck were the only records in the R.H.S. Conifer Conference Report of 1932, though both species occur in the Kew "Hand-List of Coniferae" in 1938. Since it is nearly a century since JOHN JEFFREY discovered it in British Columbia in September 1851, this is good evidence of its intractability under cultivation. It is a mountain plant and no doubt has little liking for the easy life at low levels. Perhaps a site on one of the bleaker Welsh or Scottish mountains would be more to its taste, but the slowness of its growth would make this a long experiment.

In nature it has a wide distribution, from Mt. Whitney in eastern central California northwards up the Sierra Nevada and Cascade ranges in Oregon and Washington into British Columbia, thence into Alberta and southwards on the Rocky Mountains through N. Idaho, W. Montana and the N.W. corner of Wyoming; it is not found in the Olympic Mts. of Washington.

One of the most detailed descriptions of this tree and its habitat, together with a figure of a cone-bearing branch, will be found in G. B. SUDWORTH'S *Forest Trees of the Pacific Slope*, published in 1908 by the U.S. Department of Agriculture. Another photograph of a fruiting branch appeared in the Winter issue of the University of Washington *Arboretum Bulletin*, 1949.

BRIAN O. MULLIGAN

Meconopsis × *Sheldonii*

I read with great interest the note in the December number of the R.H.S. JOURNAL on *Meconopsis* × *Sheldonii*.

Perhaps it may be of interest also to some members to know that a natural hybrid between, what I call the 'Sikkim' (true blue) *Meconopsis grandis* and *M. betonicifolia* occurred in my garden in 1938. This is still alive and has formed a fine clump, so I think I can claim it to be a true perennial. There is no hint of purple or claret colour in the flowers of my plant, and I do not think I can agree with LORD ABERCONWAY that the flowering crown dies, as I have carefully watched and each year the new growth appears to come from the same crowns.

The colour of the flowers is a very clear brilliant blue and the plant itself reaches up to about 5 feet.

CICELY M. CREWDSON

A LEAF SPOT DISEASE OF CINERARIA (SENECIO CRUENTUS) NEW TO GREAT BRITAIN

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At the Wisley Laboratory in November 1949 Cineraria leaves showing rather severe leaf spotting were received for examination and advice. The first specimens sent were from Tonbridge, Kent, and a few days afterwards further specimens with the same request were received from the Broadstairs area also in Kent. Within a day or two the increase in size of the spots showed that the disease, if any, was likely to be fairly destructive, and that the trouble merited special attention and further investigation. Accordingly, as soon as the infectious nature of the trouble had been proved by preliminary tests in the greenhouse at Wisley, a warning to growers in the form of a brief note was published in the *Gardeners' Chronicle* (1). The present account gives some further details which have since been elucidated concerning this disease.

The Symptoms. The spots in the earliest stages are very small, being almost pin-point size brownish-black specks on the leaf. They increase in size and in about ten days show as brown or blackish-brown irregular areas from $\frac{1}{4}$ inch to $\frac{1}{2}$ inch across (Fig. 109). As they get older, the central portion may turn a lighter brown with the outer zone much darker. The increase in size is fairly rapid, the spots appearing more water-soaked, the margins becoming less distinct and coalescence of the spots causing large areas of the leaves to be affected. Badly affected leaves are killed, and often spots may appear on the petioles causing the same kind of brownish rot. On the under surface of the leaf below the spots the veins become affected with a reddish brown rot and this, when the leaf is held up to the light, can clearly be seen running along the veins. Badly affected leaves gradually wither away and if infected in the stem may fall over at that point.

The Parasite. Microscopic examination of the spots revealed the presence of a fungus which was producing quantities of spores and obviously was a species of Alternaria. Young leaf spots were therefore cut out and plated and the fungus was brought into pure culture. When grown on a medium of prune agar (*p*H 6·0) and incubated at 21° C. it grew well, the mycelium being at first fluffy and light-coloured but quickly (in two or three days) assuming an olive-green colour. Both in slant and petri-dish cultures it was very slow in producing spores, but sporing was hastened and this can be recognized by an even darker coloration of the mycelium. The spores are borne on simple, unbranched conidiophores (Fig. A). They are formed in short chains and are roughly conical in shape with both transverse and longitudinal septa, swollen at one end and at the other usually tapering to a short beak. They are smooth and coloured slightly olive-buff to dark brown. They have 2–10 transverse septa and 0–8 longitudinal septa. In size they vary

considerably, being from 77μ to 155μ long averaging 125·5μ, and 15·5μ to 46·5μ wide averaging 23·3μ (100 measured). The spores are very

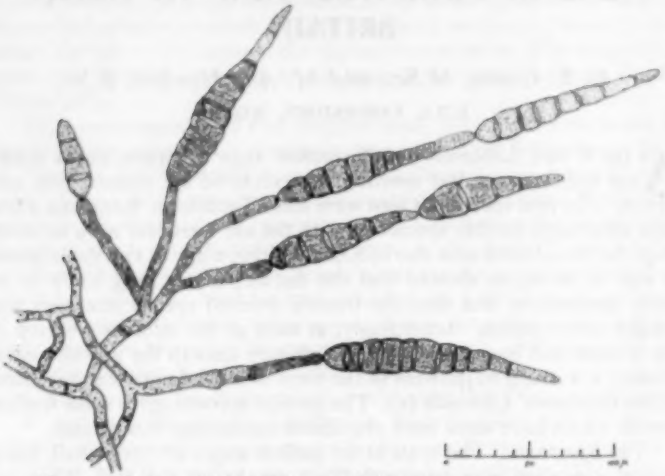

FIG. A—Spores of *Alternaria senecionis*. Camera lucida drawing

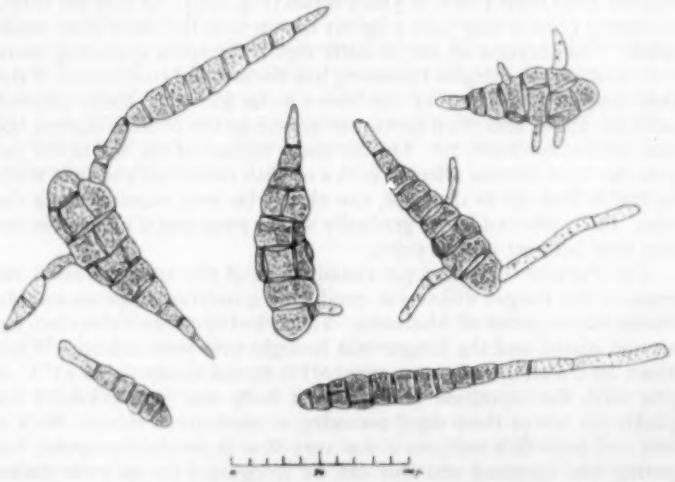

FIG. B—*Alternaria senecionis;* germinating spores. Camera lucida drawing.

quick to germinate but often the germ tubes, no matter from which cells they originate, give rise immediately to another spore similar to the parent (Fig. B). This we think occurs if conditions are slightly adverse. From the above data it was concluded that the fungus is the one known as

Alternaria senecionis, named by NEERGAARD (2), and although our spore measurements are slightly larger than those recorded by NEERGAARD (40·5 to 144μ long and 13·5 to 42μ wide) we believe it to be the same fungus.

History of the Fungus. Alternaria senecionis was recorded by NEERGAARD (3) in Denmark as causing a severe leaf spot of flowering plants of Cineraria and also a "damping off" disease of Cineraria seedlings. It was first noticed by him in the summer of 1943 and again in 1944, on seedlings in July and on large plants in December. NEERGAARD has also found the fungus present on the seeds and considers it of economic importance, especially in view of the fact that the disease can be seed-borne. Its appearance in this country is probably due to the importation of some seeds from the Continent although most of the Cineraria seed used by British growers is home grown.

Infection Experiments. Spores of the fungus in suspension in water were placed on the leaves of young, healthy Cineraria plants growing under normal conditions in the greenhouse at a temperature of 45–50° F. The spores were scattered on the leaves, in some cases on the upper and in others on the lower surfaces, and also on certain leaf stalks without any wounding whatever. The only departure from normal cultivation was that the plants were covered with a bell-jar for thirty-six hours after treatment. Infection was rapid, for small spots could be seen on the leaves in three days and these increased in size to such an extent that within a fortnight the leaves were obviously badly diseased. There was no difficulty in recovering the typical Alternaria spores from these spots and furthermore, leaves on the same plants which had not been treated developed the same spots by natural infection, which obviously had not needed the aid of the bell-jar to increase the humidity. A point mentioned by NEERGAARD (2), and easily seen, is that in the under-surface of affected leaves immediately below the spots a reddish-brown discoloration running along the veins extends beyond the area of the spots. This is best seen when the leaf is viewed against the light and is a useful symptom.

In the course of these infection tests, it was noticed that on the foliage of some plants there was some variation in the rate of growth of the leaf spots, and that whereas in some cases the growth of the spots and the consequent deterioration of the leaves was rapid, in others the spots, although they appeared quickly, showed much slower growth and the leaves, although marked, were not so quickly spoiled. It would seem that there is a difference in susceptibility between individual plants but we believe there is little likelihood of resistant varieties.

Discussion. The preliminary note (1) on the appearance of this disease in Great Britain was published because it was felt that possibly it could become a serious trouble to growers of Cinerarias. It is certainly capable of infecting the leaves and of spreading under ordinary conditions at 45° F., although it would probably be most severe if the humidity in the glasshouse was rather high. In addition there is also the question of seed transmission which would help to distribute the disease, although up to the present the trouble is not widespread and Cineraria seed is mostly home grown. According to NEERGAARD contaminated seed may

give rise to "damping off" among the seedlings but in the cases brought to our notice no seedling damping off was noticed and the disease did not show until the plants were in the larger pots. In any case it is desirable that anyone concerned in the growing of Cineraria seed in this country should watch for any leaf spots and keep the plants clean by suitable treatment.

Control. At Wisley under the glasshouse conditions already mentioned we have found that spraying with a colloidal copper spray and a spreader did not harm the plants and a good cover was easily obtained. It is recommended that where this disease is suspected the first affected leaves be removed and burnt and the plants sprayed thoroughly with a spray of colloidal copper plus a spreader, taking care to spray the under as well as the upper surfaces of the leaves. To our knowledge this disease has been a nuisance in four areas in Kent and one in Eire.

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SOME CHILEAN PLANTS CULTIVATED IN BRITAIN

G. W. Robinson

PART II

THERE is a whole range of spiny members of the Rhamnaceae, though few of them are in cultivation in Britain. The three genera Colletia, Discaria and Trevoa are so much alike, and have been so mixed taxonomically, that it is by no means easy to determine them. All are curious and interesting spiny shrubs, with small white or rosy flowers. Colletia is undoubtedly the best known of the three, and *C. armata* and *C. infausta* are fairly common in collections. *C. armata* reaches 10 or 12 feet high as a bush and considerably more on walls. It is just a mass of hard terete spines with practically no foliage. Its small waxy white flowers are fragrant and are produced in autumn. It was introduced by VEITCH'S from the Southern Provinces, though it is recorded as far north as Santiago. *C. infausta* was grown under the names of *C. horrida* and *C. spinosa* and was correctly determined by MR. N. E. BROWN in *Gardener's Chronicle* September 1916. It is very similar in habit to *C. armata* but is spring flowering; the white flowers are tinted with red or purple as is well shown in *Bot. Mag.* t. 3644 and *Bot. Reg.* t. 1776. *Colletia hystrix* is a small, very spiny and xerophytic shrub common in the Central Provinces especially on the sand dunes. An excavation exposed an enormous tap root like a small tree trunk, and out of all proportion to the size of the shrub.

Discaria serratifolia is a closely allied plant which is usually grown in Botanic Gardens. It has long slender spines rather more spaced out than in Colletia and its fragrant white flowers are borne in profusion. MR. BEAN gives the date of introduction to Kew as 1853. It was one of the plants collected by CUMING about 1830, though his seed may have failed to germinate. *D. discolor* is one of MR. COMBER'S introductions which is described by BEAN in Vol. 3 of his *Trees and Shrubs* but I have neither grown nor seen it. *Trevoa trinervis* is a dwarf spiny shrub which also has fragrance to recommend it. It is extremely common in the Central Provinces. I introduced it in 1926 but it did not prove hardy.

The Pea family is represented by both shrubby and herbaceous plants. Cassia species are amongst the finest shrubs. Two species in particular are very common in the valleys of Central Chile, one preferring the hot and dry slopes the other part shade deep in the valleys. The latter, *Cassia stipulacea*, has taken kindly to cultivation at least under glass, and has flowered freely both at Wisley and at Kew. It has rather small flowers for the genus but they are borne profusely and are of an attractive orange shade. Both were collected in 1926 and sent to Kew and other gardens. I could, however, scarcely claim them as new, as SWEET'S *Hortus Britannicus* gives the date of introduction as 1786. The other species, *C. Closiana* was, I believe, a failure, as it declined to flower. It is, however, a beautiful plant in its native country and would probably be as successful in the Riviera or S. Africa. *Psoralia glandulosa* is a bush of erect habit some 10 or 12 feet high. Flowering in autumn it has racemes of small blue pea-like flowers. It is known to every Chilean child, as the young shoots are used as an infusion and cooling drink. There was for many years a fine plant outside the Mexican house at Kew but it is not often seen in cultivation. It was amongst the earliest Chilean introductions and is mentioned so early as 1770, and figured in the *Bot. Mag.* t. 990 in 1806.

Deciduous shrubs are not frequent in Chile, but one of them, *Acacia Cavenia*, is in certain districts the dominant species. In habit it is close growing and the branches are heavily armed with spines which have earned it the vernacular name "Espino." Its golden yellow flowers are attractive and are freely produced in September and October.

Sophora tetraptera is found so far north as Valparaiso but usually in a stunted and dwarf condition, having become an extremely drought-resistant slow growing shrub some 3 feet high and spreading by subterranean stolons to make large clumps.

Lathyrus pubescens is a lovely climber for a warm sunny situation but is neither reliably hardy nor a long lived plant. Its flowers are lavender in colour, pleasantly scented and produced over a long season. Seed is usually freely produced and it is worth while raising a few annually. It is an excellent cool-house plant where conditions are not sufficiently congenial for outdoor cultivation (*Bot. Mag.* t. 3996). MR. COMBER found and introduced a lovely white form which I hope is still in cultivation. He also introduced *L. magellanicus*, which received the Award of Merit of the R.H.S. in 1929, from his seed. It produces racemes of purple flowers, the keel being paler in colour. It is probable that all the early figures and records under this name refer to the allied *L. nervosus*

'Lord Anson's Pea' which is a plant of the East coast (Argentina) and much less hardy.

Lupinus microcarpus is one of the commonest annuals in some parts of Chile. It is only a foot or so high and lavender in colour. It has proved a difficult plant as it damps off in wet weather in Britain, it has in fact been introduced and lost several times (*Bot. Mag.* t. 2413, 1823).

Chilean Rosaceae are best known by the Geums which are in fact the parents of most of our garden varieties. *G. chiloense* I still have, though it is not often seen outside Botanic Gardens. It is brilliant and free flowering. It has of course long been superseded in popular esteem by its double forms particularly the old favourite 'Mrs. J. Bradshaw' a plant which received its Award of Merit over 40 years ago. The species has been listed and grown as *G. coccineum* and has been figured several times under this name. *G. Quellyon* is a form of it which is given specific rank by some authorities. The closely allied *G. magellanicum* with yellow flowers also has been eclipsed by the numerous garden varieties mainly derived from it.

Acaena is of interest as one of the Genera found in both S. America and New Zealand, the species being closely allied and similar in habit and appearance. At least half a dozen Chilean species have been in cultivation, being used chiefly for crazy paving work and carpeting under bulbs. The best known is *A. argentea* a useful prostrate-growing plant with conspicuous spherical fruits. These plants are very unpopular in their native habitats as the fruits become matted in the wool of sheep and other animals. They have sharp thorns and often inflict great pain on dogs by getting between their toes.

An entirely different type of fruit is produced by the allied 'Pearl-berry' *Margyricarpus setosus*. It is a dwarf shrubby heath-like perennial which revels in hot dry situations. It is in fact as drought resisting as a cactus, and is common on the coastal sand dunes where the sand gets so hot that one cannot sit on it.

Fragaria chiloensis is of course one of the parents of our garden race of strawberries, it is still in cultivation in Botanic Gardens. Native of the Chonos Archipelago, Valdivia and Juan Fernandez, it was introduced to Europe by a French officer named FREZIER.

The Saxifrage family is best represented by Escallonia of which a number are Chilean, though they are unfortunately not hardy everywhere. The hardiest is *E. Phillipiana*, a deciduous species. It has white flowers more open than is usual in the genus. A native of Valdivia it was introduced by PEARCE for VEITCH'S and named in honour of one of the most notable Chilean botanists, PROF. R. A. PHILLIPI. The best known is probably *E. macrantha* which is so frequently used as a wall shrub, though in the West it is extensively planted in the open and makes immense bushes, it is frequently used as a hedge plant. The bright red flowers are decorative and the evergreen foliage always cheerful. It was one of LOBB'S introductions from Chiloe about 1846, and has been figured in the *Bot. Mag.* t. 4473. The well-known hybrid between these two species, *E. Langleyensis*, is still one of the most free flowering and decorative varieties. Other red flowering species are *E. rubra* an old garden plant, *E. punctata* and *E. Fonkii*. *E. punctata* is regarded as the

hardiest of the evergreen group. It was introduced in 1827 and is figured in *Bot. Mag.* t. 2890. *E. Fonkii* was introduced by MR. COMBER so recently as 1926. *E. viscosa*, the Pig plant from its unpleasant odour, has white flowers and is also a hedge plant in the West. Other white flowering Chilean species are *E. illinita*, also unpleasant in odour when in flower and *E. pterocladon*, the latter being another of LOBB's introductions, from Patagonia. Two others are rarely seen except in Botanic gardens and similar collections; they are *E. revoluta*, and *pulverulenta*.

Francoa is an old and well-known garden genus. *F. sonchifolia* is probably the hardiest species and distinguished by the fact that the leaf stalks are winged. It has compact inflorescences of pink flowers. There is a figure in *Bot. Mag.* t. 3309. *F. appendiculata* has pale rose flowers and is figured in *Bot. Mag.* t. 3178, *Bot. Reg.* t. 1645 and also LODDIGES *Botanical Cabinet* 1864. The white flowered *F. ramosa* was once a popular cottage plant but is not so frequently seen now (*Bot. Mag.* t. 3824).

Hydrangea integerrima is an evergreen self-clinging climber with thick leathery foliage and panicles of white flowers. It grows up the trunks of trees in the Southern Provinces and was introduced into cultivation by MR. COMBER.

There are few genera in cultivation which exhibit such a range in size as Gunnera; two species are Chilean, *G. chilensis* (syn. *scabra*) and *G. magellanica*. *G. chilensis*, though not so large as *manicata*, can still claim to be one of the most imposing herbaceous plants with its enormous foliage and spikes of orange fruits. It is distributed throughout the whole length of Chile and the leaf petioles are still eaten as described by HOOKER in *Flora Antarctica*; the vernacular name he used "Panke" or "Panque" is also still in use. *G. magellanica* in contrast is a prostrate growing, mat-forming plant, with a carpet of dark shining leaves some 3 or 4 inches high. Coming as it does from the cold and wind-swept Straits of Magellan, it can claim to be the hardiest species; it closely resembles some of the even smaller New Zealand species. The family to which they belong, Halorageaceae, is rather an odd one and has few good garden plants.

One of the commonest plants in the woods of Central Chile is the 'Arrayan.' It has had a chequered career from a taxonomic point of view, having been known as *Myrtus Luma*, *Eugenia Luma*, and *Eugenia apiculata*, while we are now told to call it *Myrceugenia apiculata*! It scrambles through other vegetation to an incredible length. It was one of LOBB's early introductions, but in most parts of Britain it must be grown under glass, or on warm sheltered walls. It has white flowers, large in proportion to the foliage, followed by black fruits (*Bot. Mag.* t. 5040). *M. Ugni* is no more hardy than the preceding but is sometimes grown on sheltered walls; it has smaller and more globose pinkish white flowers. The purple fruits are edible and are in fact sold in the markets of Chile. This plant was also introduced by LOBB (*Bot. Mag.* t. 4626). *Myrtus Lechleriana* was introduced by MR. COMBER under No. 1038 and is figured in t. 9523 of the *Bot. Mag.* It is much like *M. apiculata* but has smaller flowers and the leaves are less sharply pointed. Though I have seen the plant I have not yet grown it, nor do I remember

seeing it in Chile. A closely allied species *M. Cheken* was another Veitchian introduction; it is only suitable for the milder counties or for greenhouse cultivation, though it seems to have been fairly extensively grown at one time (*Bot. Mag.* t. 5644).

In the Onagraceae we find some very old garden plants both amongst the Evening Primroses and Fuchsias. *Oenothera acaulis* (*A. taraxacifolia* of gardens), is one of the best of the white Evening Primroses. It is extremely common in Central Chile and though the individual flowers are short lived, the display is continued for weeks; the flowers being produced on long prostrate trailing growths, radiating from a central crown. This crown is so like the Dandelion, indicated by its synonym, that many valued plants have been eradicated by well-meaning but uninitiated assistants. The large flowers open pure white, but change to a delicate pink before withering. It has been known since 1824 but does not seem to have been developed or "improved." There is an excellent plate in the *Bot. Reg.* t. 763. The plant sometimes seen labelled *O. acaulis* var. *aurea*, is really the N. American *O. triloba*. They are so much alike in habit and fruit that the mistake is not surprising. Though naturally a perennial it does not winter well, consequently it is usually raised under glass and treated as an annual. It can, however, be sown out of doors in April. It enjoys the distinction, unusual in this genus, of not having been split from the parent stock and provided with a synonym or sub-generic name. *O. odorata* hails from further south and is hardier though not a long-lived plant. Of slender graceful habit, it grows to 3 or 4 feet. The leaves are linear-lanceolate and the flowers soft clear yellow. There are two excellent figures, the first being *Bot. Reg.* t. 147. The text gives the information that the plant was introduced in 1790 by a ship's surgeon who collected it at Port Desire, Patagonia. The seeds were bought by SIR JOSEPH BANKS and flowered in the Apothecaries Garden at Chelsea in 1816. The text also adds that "it is now very common in our gardens and deservedly so from the elegance and singularity of the foliage and fragrance of the flowers." It has in fact become so much at home that it was recorded as a naturalised alien in the *Journal of Botany* in 1905. The *Bot. Mag.* figure is dated 1823, t. 2403. The equally delightful pale coloured variety *sulphurea*, comes true from seed, which in both is freely produced. *O. Bertolonii* is nearly allied but more sprawling and untidy in habit, I believe it was introduced by MESSRS. ELLIOTT AND GOURLAY. It is striking in the reddish staining of both stems and foliage, has flowers of a good clear yellow, and seems a good perennial.

Fuchsia magellanica, syn. *F. macrostemma*, 'El Chilco' trails its long flexible branches through other shrubs, intertwining and suspending its pendulous flowers for the benefit of the lovely little humming birds or "Picaflores"—delightful little creatures which seem to specialise in such inverted flowers as Fuchsia and Lapageria. It is of course a very old plant in cultivation, a number of forms were introduced and from these a considerable range of hybrids and varieties have been raised. One of the earliest figures is *Bot. Mag.* t. 97 and other forms are shown in var. *conica*, *Bot. Reg.* t. 1062, var. *discolor*, t. 1805, t. 847, t. 1052, and *Bot. Mag.* t. 2507. More recently the form collected by MR. COMBER, No. 1031,

gained the Award of Merit in 1930, and MR. ELLIOTT's unfortunately named var. *alba*, gained the Award in 1932. This has proved a vigorous and hardy form, although it is not white but pale pink. *F. lycioides*, syn. *F. rosea* has also been known in British gardens since 1796 when it was introduced by ARCHIBALD MENZIES and flowered in the King's Garden at Kew (*Bot. Mag.* t. 1024). It is extremely succulent and drought-resisting, losing most of its foliage during the hot dry summer of Central Chile. It produces hundreds of its pink flowers, small individually but striking en masse.

The Loasaceae is one of the most striking and interesting families to be found in Chile. Most of them, however, have undesirable traits, which do not recommend them as garden plants. They are mostly succulent and tender and many possess stinging hairs which can have most painful and persistent effects. Some of them are usually to be found in the Natural Order beds of Botanic Gardens where the sharp colour contrasts, curious structure of the corolla, and spiral dehiscence of some of the fruits always attract attention. The scarlet flowered species *Cajophora lateritia* is one of the best known, it is somewhat scandent in habit, and requires a few twigs to ramble over. It is figured (as Blumenbachia) in *Bot. Mag.* t. 3632. *Blumenbachia insignis* has white flowers followed by egg-shaped twisted fruits, it is straggly in habit and a foot or so high. It has been in cultivation since 1826 (*Bot. Mag.* t. 2865). There are over 30 species of Loasa in Chile alone, many of which have been introduced and lost. They are known collectively by the name 'Hortiga' or 'Ortigo' and many species are common to both sides of the Andes. *Loasa acanthifolia* was figured in 1824 in the *Bot. Reg.* t. 667. This is an excellent plate and clearly shows the curious structure of the flowers, and their bold scarlet and gold colouring. *L. tricolor* which is still in cultivation is similar in colouring and habit though smaller in all its parts. Both have vicious stinging hairs. *L. prostrata* was figured in the *Bot. Mag.* t. 6442. Another interesting member of the family and without its stinging hairs is *Scyphanthus elegans* (syn. *Grammatocarpus volubilis*) the Golden Cap flower. This is an annual with a twining or scrambling habit, resembling a Tropaeolum; it has rough stems, and clear yellow flowers, followed by cone-shaped spirally twisted fruits. Common in Central Chile it has been introduced and lost several times; it is figured in *Bot. Mag.* t. 5928, and was given the Award of Merit in 1929.

A number of Cacti are native to the drier parts of Chile, some are in fact one of the features of the landscape. The most striking is *Cereus chilensis* known as 'El Quisco'; it has numerous parallel columnar stems some 4 inches in diameter and 10 or 12 feet high, bearing white flowers and edible fruits, about the size and shape of a golf ball. Smaller but quite striking in its way is 'El sandillon' a plant of the sand dunes and coastal rocks. It is *Eriosyce sandillon*, a spiny barrel-shaped species, bearing rings of pink flowers round the crown of the stem.

I was never so fooled by a plant as by one of the Umbelliferae, *Eryngium paniculatum*. It has a spreading rosette of narrow, hard and spiny foliage, closely resembling a Bromeliad. I had provisionally labelled it as such and could scarcely believe my eyes when it flowered

and produced 3-feet-high inflorescences which were quite obviously an Eryngium. It is, I think, still in cultivation.

Relbunium ovale, a plant of Central Chile, closely resembles in habit its European relatives the Galiums. It scrambles up vegetation, wire fences, or other suitable means of support. A fence covered in this way is a lovely sight in autumn as the plant produces masses of small coral red fruits not unlike those of *Nertera depressa*. It has been in gardens more than once but appears to have died out once again. *Nertera depressa* is, of course, found in Chile as well as New Zealand, Tasmania, and Antarctica, but I have not seen it in the wild.

(To be continued)

AWARD OF GARDEN MERIT—LXXXIV

398 LILIUM DAVIDI

Award of Garden Merit, October 19, 1948

THIS fine Lily was fully described and illustrated in Part 6 of the Supplement to Elwes' Monograph of the Genus Lilium and the article which was reprinted in the 1949 *Lily Year Book*, also dealt with the systematic position of this Lily and its relationship to *L. Davidi* var. *Willmottiae*. It was first collected by PÈRE DAVID in 1869 in the high mountain range between Moupin and Szechwan in Western China and it was later introduced to cultivation from bulbs collected by E. H. WILSON.

Lilium Davidi is one of the easiest Lilies for the garden and will grow in full sun or in a semi-shaded position on the edge of a woodland. The flower spikes of a well-grown specimen reach 4 to 5 feet and bear numerous deep orange yellow flowers with recurved petals, heavily spotted on the inside with deeper colour. The variety *macranthum* is slightly more vigorous than the type and is probably the best one to grow. *L. Davidi* var. *Willmottiae* is separated from the type species by the longer and more drooping pedicels. It is one of the most floriferous and easily grown Lilies available for English gardens. Both the type and the varieties will grow in calcareous soils, although they are generally seen in better condition on neutral or slightly acid soils. It can be propagated readily from seed or from scales or from small bulblets produced along the underground rhizomes which often develop in this species.

399 MAHONIA PINNATA

Award of Garden Merit, June 2, 1947

This is one of the best of the early flowering Mahonias. It makes a rather larger shrub than the better known *Mahonia japonica* and specimens up to 10 feet in height can be seen. The flowers are pale lemon-yellow in colour, slightly scented and borne freely in upright racemes rarely exceeding 4 inches in length, while those of *M. japonica* are borne on lax racemes which, when the flowers are open, grow almost

horizontally. In *M. pinnata* these are not confined to the top of each branch but are also borne in leaf axils down the stem. The foliage is evergreen and each compound leaf bears ten or more leathery leaflets, sinuately spiny-toothed and slightly lustrous above, but not so glossy as those of *M. japonica*. A well-grown specimen provides a handsome feature in the garden at any season and the species is tolerant of a wide range of conditions, although it does not appear to be quite so hardy as *M. Aquifolium*. MR. BEAN described it as "altogether the most desirable of the Mahonia group." It is a native of Western N. America and was featured in the *Botanical Magazine* (t. 2396), under the name *Berberis fascicularis*.

400 PHILADELPHUS × NORMA

Award of Garden Merit, April 4, 1949

This is one of the finest of the hybrid Philadelphus sometimes known to gardeners as Mock Orange. They are among the best shrubs for garden decoration in late June and July and this hybrid is frequently laden then with large single saucer-shaped white flowers. Semi-double forms may also be found. Unfortunately the scent is not nearly so strong as in the majority of the species. The exact origin of this variety is not known, but it is included in the long list of good varieties raised by MESSRS. LEMOINE of Nancy and REHDER has suggested that it may be *P.* × *Lemoinei* × *P. grandiflorus* and includes it under his group hybrid name of *P.* × *cymosus*. It was given an Award of Merit in 1913. The growths are long and slender and often arch over, weighed down by the mass of flowers. They should be pruned after flowering by cutting away the old wood that has flowered. An open aspect is best for these Philadelphus, but they are tolerant of a wide range of soils and conditions in the garden and are absolutely hardy. They are easily increased by cuttings made from young shoots of the current year's growth.

401 RANUNCULUS FICARIA GRANDIFLORUS

Award of Garden Merit, May 13, 1946

This very fine form of the Lesser Celandine of our woodlands and marshes is distinguished from the main species, which itself is variable in size under different conditions, by the generally larger size of all its parts. It is figured in the *Botanical Magazine* (t. 9199), where a full description of its systematic position will be found. DR. W. B. TURRILL suggests there that it may be a tetraploid of the normal plant, and this has been subsequently established. It is found in countries bordering the Mediterranean from Spain to Syria but is hardy in English gardens and easily cultivated, although it does not spread so rampageously as our ordinary Lesser Celandine. The stems reach a height of 7 to 8 inches while the petals of the flowers are nearly an inch in length and half an inch in width, rounded at the apex but gradually narrowed below. The colour is the same bright yellow as in the Lesser Celandine and the petals shine in the same manner. It is a suitable plant for the rock garden or the wild woodland garden. It is said that it will thrive in drier situations than the British species.

402 SALVIA AMBIGENS

Award of Garden Merit, October 17, 1949

This attractive herbaceous plant which has been grown at Wisley under the name *Salvia coerulea*, is one of the best blue flowers for autumn decoration in the border and can frequently be found in flower during October as well as in August and September. The flowers are deep blue and are borne in terminal racemes of 6 inches or more on spikes up to 3 feet in height. It has been planted at Wisley in combination with the late yellow flowering Hypericum 'Rowallane hybrid' and the two make a good combination. It is hardy enough in this country to stand all except a very severe winter in the open. Unfortunately the name *S. coerulea*, under which it is generally known, belongs more correctly to another species and therefore has had to be rejected here.

403 SPIRAEA DISCOLOR

Award of Garden Merit, May 30, 1949

This is one of the best of the shrubby Spiraeas for mid-summer decoration, usually flowering freely during July. The individual flowers are creamy-white and small, but they are borne in large plume-like panicles often a foot in length, the size of the panicle depending on the cultivation and pruning. These panicles droop over at the end of long stems and are produced in great abundance. Pruning consists of cutting out the old wood after it has flowered. The longer of the young shoots may also be shortened if it is desired to keep the bush from making too great a height. If the young shoots are left unpruned it will in time reach a height of 15 feet. It is perfectly hardy and is suitable for an open or partly shaded position in the shrubbery or as an isolated specimen with a dark background. It was introduced by DOUGLAS from N. America in 1827. Some American botanists have split off the shrubby Spiraeas with the fruit an achene containing a single seed and have renamed this section, of which *S. discolor* is the commonest, Holodiscus, but this name has not been widely adopted as yet in this country.

404 TULIPA SPRENGERI

Award of Garden Merit, July 26, 1949

This fine species from Asia Minor is the latest of all the Tulips to flower, often blooming at the end of May. It is a good garden plant often establishing itself in light shade under shrubs and seems to do best when left alone, sometimes seeding itself freely about. The flowers are single, light crimson scarlet in colour, the three inner segments being slightly darker than the outer ones. These outer segments are marked longitudinally with yellowish buff. There is no basal blotch. This species may be distinguished by the long, rather narrow and pointed perianth segments. The backs of the inner segments show a well-marked mid-rib, with two channels. SIR DANIEL HALL in *The Genus Tulipa* also reports that it is unique in the character of its filaments and stamens and he is unable to fit it into any of the sections.

405 VIBURNUM BITCHIUENSE

Award of Garden Merit, July 26, 1948

This is one of the finest of the Viburnums, usually flowering in April and May and resembling *V. Carlesii*. It is, however, a slenderer and more open growing shrub, often reaching a height of 8 feet and as much across. The flowers are loosely arranged in panicles 2 to 3 inches across and are tinted pink on the outside of the buds, but the flowers open white. They are nearly as fragrant as those of *V. Carlesii*. It is a native of Western Japan, and takes its name from the province of Bitchiu. (Fig. 110.)

It should be given an open position in the garden or in light woodland where it will have sufficient space to develop. It is only as a large bush that it really shows its quality and, as such, many authorities have considered it superior to *V. Carlesii*.

BOOK NOTES

"Drawings of British Plants." By Stella Ross-Craig. Part III. 77 plates. (G. Bell & Sons Ltd.) 9*s*.

The first two parts of this excellent series of black and white illustrations were reviewed in this JOURNAL **74**, 48 (Jan. 1949). The third part, devoted entirely to the family Cruciferae, maintains the same high standard. The details of flower structure, etc., so accurately and clearly portrayed should make it a valuable help to the teaching of botany, and it is certainly indispensable for all who are interested in the flora of the British Isles or indeed that of north-western Europe as a whole. The horse-radish (*Armoracia rusticana*, syn. *A. lapathifolia*) and the coral-root (*Dentaria bulbifera*) are the only species of which the seed and mature fruit are not illustrated, presumably because they propagate almost exclusively by vegetative means in Britain. Perhaps a supplementary plate could be published later if mature fruits of British origin become available to the artist.

W. T. STEARN

"Annuals." By Roy Hay. Second Edition. 240 pp. Col. plates., Illus. (John Lane, The Bodley Head.) 12*s*. 6*d*.

The first edition of this book appeared in 1937 and was reviewed at length in this JOURNAL **62**, 422 (1937) by the late Viscountess Byng of Vimy. She noted that it filled a gap which had been empty for some time, and the same is true of the present edition. A number of new varieties are mentioned and there are more coloured plates, but the text as a whole has not been greatly altered. Since this is a reference book, some of the lesser known annuals such as *Delphinium orientale* and *Tolpis barbata*, which often occur in botanic garden seed lists, might well have been included. This new edition is nevertheless a welcome addition to the list of standard horticultural books which passed out of print during the war years but have now become available again.

"Manual of Bacterial Plant Diseases." By W. J. Dowson, M.A. D.Sc. (Adam & Charles Black.) 16*s*. net.

It is not generally realized that among the losses suffered in our crops due to attacks by fungus parasites, viruses, and the like, those ailments due to infection by the incredibly small organisms known as bacteria are not to be despised and certainly cannot be ignored. There are many important diseases of horticultural plants caused by bacterial infection but the specialized and careful technique required for close study of them causes many workers to fight shy of becoming too interested in this branch of plant disease investigation. Dr. Dowson has for many years been engaged in the investigation of plant diseases and has paid particular attention to those caused by bacteria and we are indebted to him for much original work not only on specific diseases but also in providing us with much guidance on the proper nomenclature and classification

of the pathogens concerned. He has now provided us with this book from which research workers and students in plant pathology can obtain the most up-to-date information they could wish for on the subject.

The book is divided into three main parts. The first part gives chapters on the general characters of bacteria, on their nomenclature and classification as advocated by the author in comparison with older systems, on symptoms which indicate bacterial infection in plant tissues and on how to begin an investigation of such troubles. Part II is concerned with the preparation of many kinds of media, its sterilization and standardization, as well as the biochemistry of bacteria and technique for staining them before microscopic examination is commenced. Part III discusses various economic diseases caused by bacteria including not only all those known in Britain but many others which although so far only known abroad may yet at some time become a menace here. There are maps showing the world distribution of eighteen important diseases, there are references to all the important work done on bacterial plant troubles and there are fifty-four photographs of very good quality.

To research workers, students and even advisers in plant pathology, this book is most welcome, as the last one of its kind was published twenty years ago in America. We have no doubt at all that it will be of the utmost assistance to everyone engaged in research on plant diseases. It is well written and well published and the price is most reasonable. Although the errors may not be serious it is a pity that an errata slip was not included.

D. E. GREEN

"Gall Midges of Economic Importance." By H. F. Barnes. Vol. 6. "Gall Midges of Miscellaneous Crops." 229 pp. and 14 plates. 15s. net. (Messrs. Crosby Lockwood & Son, Ltd. 1949.)

This is the fifth out of eight volumes to be published, and appears before Volume 5, which is in preparation. The subject matter deals with Gall Midges injurious to Bamboos, Basket Willows, Beverage plants (Cocoa, Coffee, Tea, Hop), Dye and Fibre plants; aromatic, culinary and medicinal Herbs; Insecticide plants, Rubber, Spices and Sugar plants.

This volume will appeal to an even wider circle of biologists and horticulturists than those formerly published by reason of the detailed information concerning the economic uses of the host plants in addition to the entomological aspect. Such data will appeal to all whose interest lies in plants and plant products additional to "those that provide food, beauty, shade and timber for man and his animals" by the inclusion of plants used for beverages, dyes, fibre, oil, rubber, insecticides and herbs.

The format is similar to that of the previous volumes, while the high standard of illustrations is maintained.

The global review of these important plant pests and of the wide range of host plants included is a further indication of the meticulous care that has been taken by the author to provide authoritative data on the subject of Gall Midges.

G. FOX WILSON

"Adrian Feint: Flower Paintings." Ed. by S Ure Smith. Introduction by Tatlock Miller. 12 col. pl. 16 monochrome pls. (Pub. by Ure Smith Pty., Ltd., Sydney.) 1948. £3 15s.

Mr. Feint is well known as a many-sided artist in his own country and this book will form a welcome introduction to his art for many people in this. As the title indicates, only his flower studies are represented in this series of plates; and the flowers, whether distinctively Australian or not, are of cultivated types and shown mostly in mixed groups, in vases, in a curtained recess or more often on the window-sill of a room with a view. The background is often the sea, and composition and atmosphere are dignified, harmonious and peaceful, seeking no merely sensational effectiveness. The colouring of the originals is no doubt more lively than in the plates, for the best colour printing has its limitations.

A more whimsical note appears in the coloured woodcuts which adorn the text. Has anyone before Mr. Feint realized the comic possibilities of shells? "Poor relations" is a delightful piece of fun; and "Strange Shore" has its own eerie suggestiveness, but shells with almost human characters, flying, dancing or resting, fill the pages.

In a preliminary essay Mr. Tatlock Miller succeeds in briefly indicating, characterizing and interpreting the main developments of flower painting throughout history.

The book is beautifully produced in respect of typography, paper and binding by a publisher—Mr. Sydney Ure Smith—who is himself well known as a painter and etcher. May we hope that he will give us before long in another volume a selection of Mr. Feint's landscapes?

F. M. G. CARDEW

"Outdoor Grapes in Cold Climates." By R. Barrington Brock, M.B.E., F.R.I.C., B.Sc., F.R.P.S. 71 pp. (Tunbridge Printers, Ltd.) 6s.

At the mention of Grapes the English gardener's thoughts immediately turn to the greenhouse, yet at one time the vine used to be successfully grown out of doors in this country.

The author has set himself the task of demonstrating that choice varieties of Grapes can be grown out of doors under cloches and that the growing of Grapes, both for the table and for wine-making, may be a worth-while proposition without glass of any kind.

In the spring of 1946 the author laid down his experimental vineyard at Oxted and he intends to investigate there all the cultural problems that arise. In this little book which is in the nature of a first report of the work so far accomplished, Mr. Barrington Brock describes his methods of culture, the qualities of the varieties under cultivation and the results so far obtained. There is a short chapter on propagation and another on pests and diseases in which timely warning is given of the very real risk of introducing the pest Phylloxera into the country on imported planting material and packing. The final chapter contains tentative recommendations as to suitable varieties to plant in different situations and short notes on their management and cultural requirements.

Mr. Barrington Brock is an enthusiast, his love for his vineyard is infectious and we feel that this first report from his experimental station will appeal to all lovers of good fruit who wish to experiment with the vine on their own ground.

E. ROBINSON

"The Huntington Botanical Gardens 1905–1949." By William Hertrich. 167 pp. 4to. (The Huntington Library, California.) 5 dollars.

This well-illustrated account of a now celebrated garden has as a sub-title "Personal recollections of William Hertrich, Emeritus Curator." The book is printed by order of the Trustees of the Henry E. Huntington Library and Art Gallery at San Marino, California, as a tribute to William Hertrich on completion of 45 years as Superintendent of the estate of Henry E. Huntington and as Curator of the Huntington Botanical Gardens. Mr. Huntington acquired a ranch in 1902 and in 1904 the author entered his service to superintend its conversion into a residential estate with gardens designed not only for beauty but to test the adaptability of plants from regions with a similar climate for the region around. Great collections of palms, cacti, as well as a great variety of other plants were brought together with this end in view. Mr. Hertrich played his part in all the developments and now tells the story of the growth of the garden, the building of the residence to contain treasures of art and literature, and how, on its founder's death in 1927, the grounds of 200 acres and buildings were put in trust for public use. Of the 167 pages in the book 64 are occupied by illustrations from photographs of scenes and plants.

"Botanik der Gegenwart und Vorzeit in culturhistorischer Entwickelung: ein Beitrag zur Geschichte der abendländischen Völker." By Karl F. W. Jessen. xxii + 495 pp. (1864, republished in 1948 by Chronica Botanica Co., Waltham, Mass., U.S.A.; Wm. Dawson & Sons, Ltd., London, W.C. 2) $6.00.

This volume is the first in a series of facsimile reprints of out-of-print and classic scientific books which the enterprising Chronica Botanica Company proposes to publish under the title *Pallas*. As the editor states, Jessen's work, though originally published in 1864, still remains "the best concise all-around history of botany ever attempted." It is less detailed than Ernst Meyer's massively erudite *Geschichte der Botanik* (1854–57), which occupies over 1,800 pages without extending beyond the year 1600, but Jessen brings the history of botany down to 1860, the year in which Darwin's *Origin of Species* was first translated into German. Read as a continuous narrative it gradually builds up a picture of the development of man's long interest in plants from the utilitarian aspect into botany as a many-sided science. A student of Georg Gervinus, the historian and commentator on Shakespeare, Jessen saw botany not simply as the amassing of facts about plants but as a manifestation of the cultural and intellectual progress of the European peoples. His accounts of individual botanists and their work thus relate them to the knowledge and ideas of their times. As a reference book this history is of particular value for the concise appreciations as well as for the essential facts which it gives about almost every writer of note on plants from the earliest records down to the middle of the nineteenth century, and no later one-volume work has completely superseded it.

W. T. STEARN

"Chemistry of Insecticides, Fungicides and Herbicides." By Donald E. H. Frear, Ph.D. (Macmillian & Co., Ltd.) 417 pp. Illus. 33/-.

This is intended as a guide to the various insecticides, fungicides and herbicides in present use, accompanied by much chemical description. Unfortunately, in the selection of such data some items of a redundant or even erroneous nature have crept in. Nevertheless, it will be found interesting and useful to chemists and those students able to study it with discrimination.

The author has inserted a great volume not always clearly written of pure chemistry to the detriment of the insecticidal study of the materials. The methods of analysis are concise and a useful guide, but a number are already out of date.

GEO. S. WOODCOCK

"Fruit Tree Raising, Rootstocks and Propagation." (Bulletin No. 135. Min. of Agriculture. 46 pp. Ill. H.M.S.O.) 1s. 3d.

This bulletin is primarily intended for the specialist raiser of fruit tree stocks. It has been compiled under the guidance of experts from East Malling and Long Ashton research stations and can be recommended to those engaged on raising commercial stocks of fruit trees. Apples, Pears, Plums and Cherries are the fruits dealt with and in each case there is a discussion of suitable rootstocks and the methods of raising them. This is followed by sections on budding, grafting, pruning and pest and disease control in the Nursery.

"Trees have Names." By Adrian Hill. (Faber & Faber.) 80 pp. Illus. 21s.

This book is a collection of drawings of forty native or commonly cultivated British trees. The artist has succeeded for most of them in sketching the same tree from the same position in both its Summer and Winter states. Details of leaves accompany his excellent and pleasing representations of habit of growth, but flowers, even of such trees as the apple, the tulip-tree and the robinia, are ignored. The loving care bestowed upon the drawings did not extend to the text in which occur such extraordinary statements as that the ginkgo is "reputed to be the world's original tree"! Since the title announces that trees have names, not in itself a very startling discovery, the author is presumably well acquainted with them, but those who hope by his aid to ascertain the botanical names of the common trees will be disappointed; there is not one in the book and some of the English names used lack precision. As he himself says, "first and last it is a picture book." It deserved an apter title, and a more accurate text to match the quality of its honest and charming illustrations.

W. T. STEARN

"Bouquet." By G. S. Whittet. 181 pp. Col Pls. (Studio Publication.) 21s.

"Bouquet" is a 'gift-book' of reproductions of forty-eight flowerpieces with a brief introduction and comments on the individual plates. Its flowers have mostly been culled from back numbers of *The Studio*, a procedure which certainly makes for economy of production. Forty-five of the paintings reproduced are by twentieth-century painters—some good, some bad and some indifferent; to these have been added, perhaps because colour-blocks were available, a Cézanne, a Van Gogh and a Hokusai colour woodcut. The colour plates are on the whole well reproduced; but they are set in elaborate and unattractive pea-green frames, presumably so that the book may acquire a size and importance that makes it seem a reasonable purchase at a guinea. The introduction appears to have been composed for a book dealing with the history of flower-painting from palæolithic times to the present day. Such a book, with carefully chosen illustrations of flowerpieces of all ages and accurate and informative text would be welcomed by artists and flower-lovers alike; but it is hard to see what real purpose has been served by the publication of the present volume.

"Crop Management and Soil Conservation." By J. F. Cox and L. E. Jackson. Second Edition. Illus. 572 pp. (John Wiley and Sons, Inc. New York; Chapman and Hall Ltd. London) 23s.

Farmers and market gardeners in Britain are fortunate in not having soil erosion problems among the many with which they have to deal. Our much maligned insular climate can at least be thanked for this. Conditions are vastly different in continental America, Africa, and Australia where violent rainstorms might wash away overnight the topsoil of a flourishing farm or dust storms cover it with infertile soil in a single season. Soil conservation must thus be for ever in the mind of the continental agriculturist. In this book is found a store of practical information on the production of crops in relation to soil conservation, into which all would-be farming emigrants to the Colonies and Dominions could dip with profit. It should be particularly useful to

farmers in South and East Africa where temperate crops are grown under climatic conditions conducive to soil erosion. Maize, Wheat, Barley, Buckwheat, Sorghum, Soyabeans, Cow peas, Clovers, and Potatoes as well as pasture management are discussed in detail.

E. H. CHENERY

"Hearts-Ease. Herbs for the heart, the ductless glands and the nerves." By Mrs. C. F. Leyel. (Faber & Faber.) 333 pp. 21s.

The more one dips into this book, the more one wonders why it was published. It cannot be considered as a serious contribution to the use of plants in the treatment of disease. Such information as it contains is presented in monograph form, but appears to be derived mainly from ancient authorities like Gerard and Culpeper. The virtues of Heartsease appear to rely as much on a lyric by Herrick as any other evidence, while Heart Trefoil, it seems, depends on the long discredited doctrine of signatures. But what is Heart Trefoil? Three botanical names are given, apparently synonyms, Medicago maculata, Trifolium cordatus and Medicago lupulina. Trifolium Cordatum (all names as printed) we are told comes from Gerard. The rather inconsequential armchair discussion that follows leaves one wondering whether Heart Trefoil is one or two plants and with the idea that it would be an excellent plan to look at the plants and find out. Although lack of precision may not matter with such innocuous drugs, it is deplorable in the more potent. The active principles of Foxglove are referred to as alkaloids in the preface and as glucosides in the monograph, while the relative proportions and percentage of alkaloids in Scopolia (*sic*) differ widely from those given in standard textbooks. Horticulturists may chuckle over such incongruities as Rhododendron Chrysanthemum and teetotallers may take their brandy as 'Cordial poppy water'—as a medicine of course! Incidentally one gains the impression that there is only one Rhododendron.

R. MELVILLE

"Compassionate Herbs." By Mrs. C. F Leyel. (Faber & Faber.) Demy 8vo. Illus. Price 12/6.

This book with its lurid and passionate red cover is devoted to the study of herbs used for healing. Mrs. Leyel is the founder and chairman of the Society of Herbalists and so writes with authority and experience. The book is full of interesting old lore and wisdom on the subject, much of which is little heeded to-day. It is illustrated with delicate drawings by Mildred Eldridge. The number of country and continental names given for each plant adds value to the book and there can be few books which are so complete on this subject. Unfortunately, the book contains no cultural details.

"School Gardening in the Tropics." By R. O. Williams. Crown 8vo. 143 pp. Illus. (Longmans.) 3s.

This little book should be of great assistance to all those beginning a garden in the Tropics as well as to the school teachers for whom it is specifically intended. The text is clear and concise and it is illustrated by effective line drawings, which demonstrate the methods described. The author has had experience in the West Indies, Trinidad, Palestine and Zanzibar.

"Preliminary Check List of the Flowering Plants and Ferns of Griqualand West (South Africa)." By M. Wilman. Royal 8vo. 380 pp. (Deighton Bell & Co., Cambridge, Alexander McGregor Memorial Museum, Kimberley.) 45s.

This list is probably the most complete yet published of the plants of this region. There are no descriptions of the plants but the local distribution and where possible Afrikander names are given. There is a farm map indicating the collecting areas compiled by Mr. J. P. H. Acocks. This volume should be used in conjunction with Dr. J. Burt Davy's *Manual of the Flowering Plants and Ferns of the Transvaal and Swaziland*, but unfortunately only two parts of this Manual have so far appeared.

"Cultivation of Watercress." (H.M.S.O. Illus. 1/- net.)

This is Bulletin No. 136 in the series published by His Majesty's Stationery Office for the Ministry of Agriculture and Fisheries. This Bulletin has been largely prepared by Mr. Charles H. Sansom, the Chairman of the Watercress Branch of the National Farmers' Union, and carries very full directions for the choice of situation and construction of Watercress beds. It has been found that water from the Chalk and Greensand formation are usually suitable for Watercress growing, while the temperature of the water is the most important influence affecting the rate of growth.

While primarily intended for the commercial grower this Bulletin should be valuable to all who have a suitable source of water in their gardens and wish to establish a bed of Watercress. There are few plants richer in Vitamin C.

"Wild Flowers in the Rockies." By George A. Hardy and Winifred V. Hardy. Pp. 125. Illus. (H. R. Larson Publishing Co.) $7.50.

A well-produced and profusely illustrated small book which might well serve as an introduction to the wonderful flora of the Rocky Mountains and their environs. It is too elementary to be of particular interest to the advanced student. The almost lyric prose in which the descriptions are written makes easy and pleasant reading.

All the illustrations are in colour and form the major part of the book. The drawing is good and, in most cases sufficiently accurate, but the colouring is frequently over optimistic and in one or two instances distinctly misleading. This applies very particularly to the illustration of *Saxifraga oppositifolia*. There never was a Polemonium as blue as the colour depicted for *P. occidentale* and the colouring of *Epilobium latifolium*, which I have seen and admired in its native habitat, leaves much to be desired.

The naming of the plants is on the whole reliable, although *Primula mistassinica* is listed beneath its obsolete synonym of *P. Maccalliana*. Claytonia, related to the Lewisias and a member of the Portulacaceae, is given as a member of the Pink family. There are few faults in the spelling but Chimaphila is incorrectly spelled 'Chimphila.'

With so much excellent material available I think it is rather unfortunate that the authors should have selected for illustration so many of the common and less beautiful plants. The following examples are all little better than weeds and possess no garden value. *Geum strictum*, *Potentilla dissecta*, *Crepis elegans*, and *C. nana*, various Senecios and, in particular, *Lynchis apetala*. It is to be hoped that the authors and the artist will continue this work and, if possible, devote more attention to the innumerable really beautiful flowers which grow on and near the vast ranges of the Rocky Mountains.

WILL INGWERSEN

"Roses for Southern Gardens." By Bessie Mary Bird. 96 pp Illus. (University of North Carolina Press; Geoffrey Cumberlege.)

The author is an enthusiastic amateur gardener who grows perhaps a hundred or so Roses in her "yard," and has written a "light-hearted treatise on Roses for Southern gardens (of North America). It is gay and witty, chatty and informal." The book is beautifully produced in a manner which makes us a little envious of the facilities which are not yet available in this country, and the pictorial value is greatly enhanced by the very fine colour plate illustrations, which, however, we have already seen published elsewhere. Of the ten Roses selected as the best for growing, only four are well known or thoroughly tested in the British Isles and English readers should treat these lists with considerable reserve, for in the past many varieties highly successful in the U.S.A. have been proved to be of little value here. The general conditions and the cultural recommendations are so different in Georgia that, while it is always interesting to know how other gardeners work, the book can be of little practical use for the English amateur.

Mrs. Baird describes standard Roses as being "two buds of any variety inserted in one end of a smooth stem, IXL or Multiflora, the other end of which is grafted on a wild understock"!! Well, well! Several pages are devoted to Fertilizers and the *p*H of the soil. Superphosphate is "*p*H 2 or 3, but it does not give acid reaction"!! Bone meal is "*p*H 10·2, when first applied is slightly acid forming"!!! and so on. Her manuscript was apparently submitted for assistance to several well-known scientists and horticulturists, but it is a pity that her final copy was not more adequately expertized.

BERTRAM PARK

"A Gardener's Log." By Edna Walling. (Oxford University Press, Melbourne.) Aus. Retail Price 15*s*.

This book appeared originally through the medium of letters in the 'Australian Home Beautiful.' It consists of short sections, written in an easy conversational style, about gardening of various kinds in Australia. The four seasons are covered by four separate chapters. It is interesting to an English reader to see how so many plants found in English gardens fare in Australia. The author, who is a practical and experienced gardener, rightly pleads for more intelligent use of the beautiful native trees and shrubs. It is satisfactory to know that the planting at Canberra meets with her warm approval.

J. W. HUNKIN

"How to grow Annuals." By Ann Roes Robbins. Cr. 8vo. 30 pp. (Macmillan & Co.) 26*s*. 6*d*.

This book was written to assist North American amateur gardeners and consequently many of the varieties mentioned will not be easily available in this country. The author has chosen twenty-five of the most popular of annuals grown in American gardens and describes these and recommends the best varieties. These descriptions are preceded by general chapters on cultivation and the book is illustrated with small drawings at the head of each description. A list of other annuals together with short notes is included at the end of the book.

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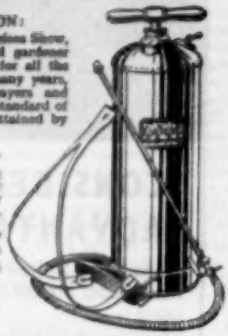

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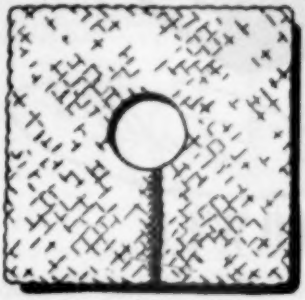

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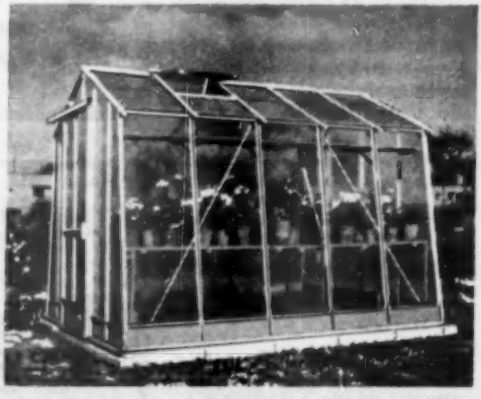

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